

Testing in Our Schools

Louis J. Karmel

A MACMILLAN GUIDEBOOK FOR PARENTS



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IN OUR SCHOOLS



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for Parents**

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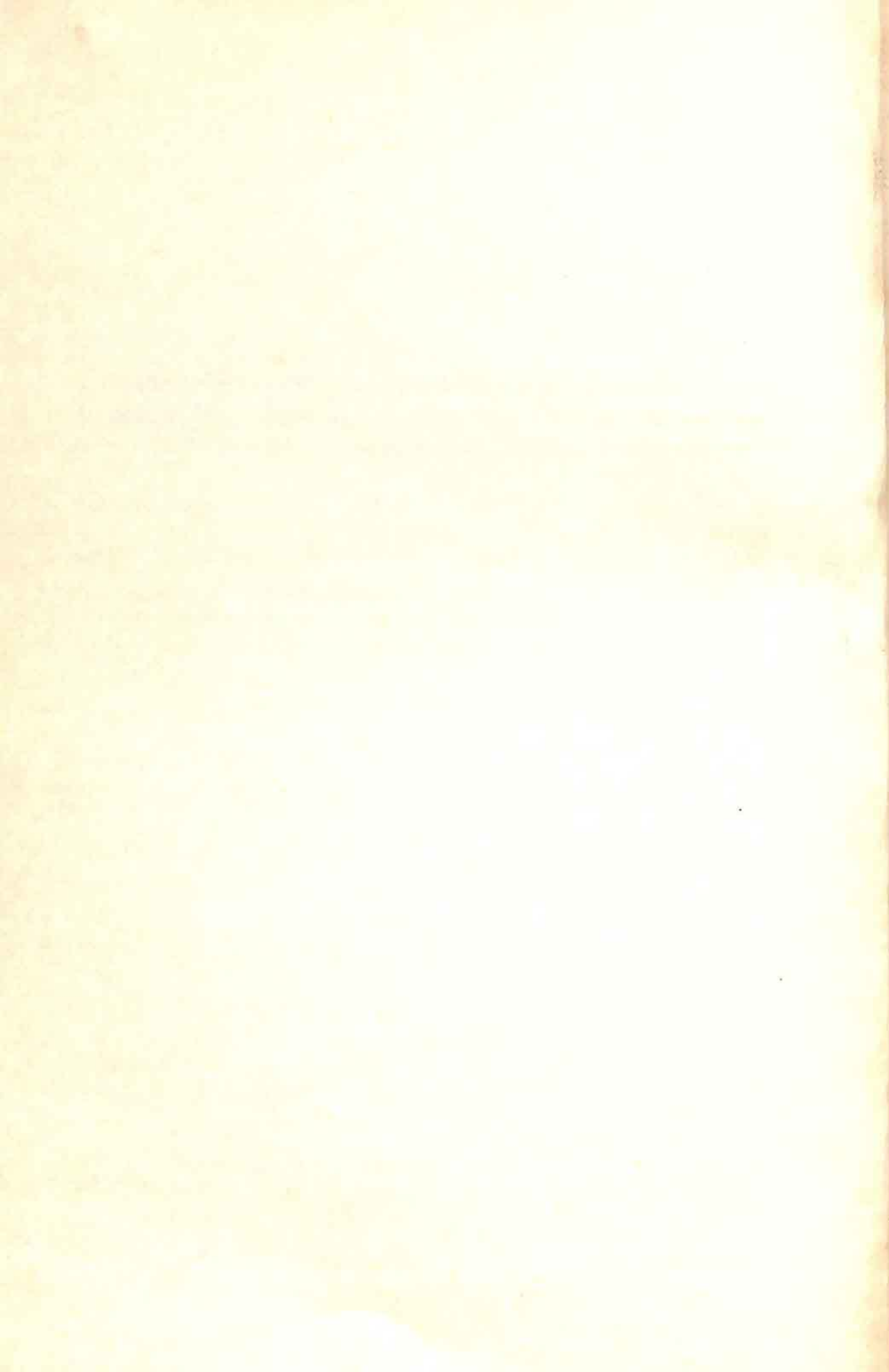
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To my wife Marylin Odom Karmel, without whose understanding and professional counsel as a teacher and mother this book could not have been written.



PREFACE

Millions of tests are administered each year to pupils at all grade levels—achievement tests, aptitude tests, intelligence tests, interest inventories, and personality tests. Testing, like so many things in the past 65 years, has gone through periods of acclaim and criticism. Today testing is as much a part of our life as radio or television, although less understandable to most people.

Since World War II, testing for educational and personal use has multiplied. Large-scale testing programs, such as those administered by the College Entrance Examination Board, have expanded in size and multiplied in numbers at an ever-increasing rate. Thus, the last half of the twentieth century is a time in which standardized testing is an integral part of our American culture.

Standardized testing reaches not only the elementary- and secondary-school child but also the adult in his search for employment. Tests are given for many purposes. For example, at the high-school level, they are administered to help each student plan his high-school career in such a way that he can achieve the maximum benefit from his school days. In addition, tests are administered for purposes of college scholarship and college admission.

Under these circumstances, it seems quite important that the use and interpretation of these instruments be understood, not only by teachers and counselors, but also by parents and their children.

In my duties as a psychologist, I have found that parents are bewildered and confused by the mass of test data that confronts them at every turn of the educational road. In fact, I find myself continually orienting parents, teachers, and the community at large about various types of tests and their meanings and implications for the child's future. I have written newspaper articles on testing to help convey the meaning of tests to parents of school-age children. The response to my articles, as well as the general state of "test confusion" among many parents, has prompted me to write this book.

The objective of this book, then, is to place before the American parent information concerning standardized testing. I have tried to present the facts of testing as agreed upon by most authorities in the field of educational and psychological measurement. Although an attempt is made to convey this information in understandable terms, accuracy and realism have not been sacrificed to present a "rosy" picture. Testing is too complex and too new a scientific study to be explained in terms that approach the absolute.

In the chapters that follow we will explore various tests, what they attempt to evaluate, how we as parents can interpret them, and what meanings they have for our children and for ourselves.

The names and academic and personal histories of persons mentioned in this book have been changed to insure their privacy. Therefore, any resemblance to actual persons living or dead is purely coincidental. It should also be mentioned that lengthy case histories have been simplified in order to illustrate various aspects of test usage.

L. J. K.

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**TESTING
IN OUR SCHOOLS**

WHY ARE YOUR CHILDREN GIVEN TESTS?

1

In the past few years it has become almost common to hear parents and other interested persons ask: "Why do our schools give tests?" This question is often followed by the statement: "I am beginning to think our children are being tested to death." It is easy to state why schools should give tests but it becomes more difficult to say why a specific school gives tests and it is even more difficult to declare that children are or are not being "tested to death." This is because schools throughout the United States do not follow a set pattern either in curriculum or testing programs. It is hoped that the reader will be in a better position to answer whether or not his children are in fact, being tested too much. It is also hoped that an understanding of why schools give tests to children will be made clear to the reader.

It is impossible to generalize about testing without taking into consideration certain pertinent factors such as the objectives and philosophy of a particular school and its resources and geographic location. It can be stated, however, with a degree of certainty, that schools administer many different tests because no one test can measure all the different facets of a child's ability and interests. Even in a single area, such as intelligence (see Chapter 2), more than one test is needed over a period of years to obtain a meaningful measure of the child's ability. In addition, the school is constantly attempting to assess present ability, aptitude, and interest. In the process of growth some of these factors are subject to change.

The basic reason that the school staff administers tests is to promote the education of your child according to his or her unique abilities.

The school in its attempt to meet the needs of your child plans its testing program with some of the following questions in mind: What types of information does the school staff need to know about its pupils? How will tests help supply this information? How can they use the information once they have it?

To illustrate how tests can help your child, I will touch upon some areas of particular importance.

Tests help the teacher to deal with individual differences in students by indicating which children have the same level of skill in a particular subject. Small groups within the large class may then be formed. Thus pupils in one group may work with the same materials and at a similar speed. All of us are aware of these individual differences. The teacher is aware of this and often feels frustrated by his inability to give proper instruction to the bright child and the slow student at the same time. If the teacher is able to use an objective instrument, such as an intelligence test, along with other criteria, he can group children within a class according to their individual ability and gear his teaching accordingly. It might be noted that even if the class has been grouped according to ability, there is still a wide range of talent within these small groups.

Tests assist the teacher in identifying the child who needs special study and remedial instruction. For example, it is very difficult for a teacher to distinguish between general low intellectual ability and a specialized problem in a particular skill, such as reading. If a teacher finds that a student is doing poorly in mathematics, he may think the student is not capable of the work. But if he has objective evidence that the child is capable, then he may concentrate on the subject matter and the specific difficulty within it. On the other hand, if the evidence presents a picture of limited ability, he can teach according to the child's ability and not expect as much as he would from a more talented youngster. In another situation the teacher may suspect a reading deficiency. She may then want to employ a test of reading ability to ascertain the degree of this deficiency. She can then provide the child with material at his level of achievement.

Tests assist in evaluating discrepancies between what the child is capable of and what he has accomplished. The child who seems to lack ability because of poor grades may in fact have a great deal of ability, but because of certain problems or emotional disturbances may not be achieving up to his capacity. Tests can give a more objective appraisal of this child. They may show a high intellectual endowment, and the teacher can then institute appropriate measures to help the youngster in his achievement. A good example of this particular problem is the case of a 14-year-old boy I had occasion to see recently. We will call him Jimmy S———. Jimmy was failing English, and the teacher felt that he should be in a slow-learner's group rather than

in her class of average youngsters. Looking at Jimmy's other grades I found he was failing in all subjects but physical education. Upon reviewing Jimmy's test record, I found that Jimmy was in the top 2 per cent of his age and grade group in intelligence. That is, Jimmy's intelligence test score showed he had more ability than 98 per cent of children his age as measured by tests. It can be seen that the teacher may have been right in a reverse sense, that Jimmy should not have been in the average group. Actually he potentially qualified for the gifted group. Of course, my first job was to find out why Jimmy was not achieving up to his ability. In counseling sessions with him, certain family problems were revealed as the main cause of Jimmy's lack of achievement. Jimmy is still in the average group, but he is doing much better in his studies. My eventual goal is to continue working with him until he is able to perform up to his level of ability. Without the tests Jimmy may have been placed in the slow-learner's group, but because his ability was measured by more than classroom performance, Jimmy may eventually realize his potential.

Tests can assist the counselor or teacher in helping to present to the student a realistic picture of his strengths and weaknesses. Recently a well-groomed adolescent girl came into my office and asked for information on nursing. She said that she had wanted to be a nurse "ever since she was a little girl." I asked her about her grades and she replied, "They're about average." Upon reviewing her test scores I found that she was particularly weak in science and mathematics and was of below-average intelligence. Speed and accuracy tests showed that she was extremely talented in clerical office skills. During our interviews we discussed the fact that nursing required a science background and that this subject seemed to be her weakest. In addition, I pointed out some of her areas of strengths, such as her clerical ability. With this evidence and her school performance the girl might now have a more realistic picture of herself and plan her life accordingly.

Tests provide information in helping the student decide on educational and vocational goals. Questions like "Shall I go to college?" and "Shall I seek a clerical or mechanical position?" are ones to which aptitude and interest tests may help provide some answers. The boy or girl who isn't sure whether or not to go to college can be greatly assisted by a scholastic aptitude test. The boy who isn't sure of the vocation he should choose can be assisted in his decision by aptitude and interest tests.

Tests can be of great value in discovering educationally and socially maladjusted children. In every school there are some students who present severe problems of educational or social adjustment. Among some of these types are the withdrawn, the unhappy, the mentally retarded, and others who are simply not adjusting to the pattern of the school. Tests render assistance to counselors and teachers in their attempts at understanding and helping these types of children.

Schools did not always have tests to assist in the education of children. Testing, as we know it today, is a relatively young science. Before 1850 your child's achievement in school would have been judged mainly by oral examination. The oral examination had many disadvantages. Each child being tested was asked different questions, and there was no uniformity either in the questioning or in the evaluation of the replies. In addition, it was time-consuming, because only one student could be tested at a time.

After 1850, oral examinations by boards of visitors were replaced by set written examinations as a basis for admission to college. At this time, the essay question became popular, in which the pupil would respond in his own words to questions given by the examiner.

The written examination had many advantages over the oral examination. It presented the same questions to each member of the group, and it let each student work for the same length of time. There was still a problem, however, in the scoring of the student's answers, for although the questions were made uniform, the scoring required a subjective analysis.

In the beginning of this century, in France, there was an increasing concern over the individual. This concern was focused on the feeble-minded and the general misfit. It was apparent to the French educational authorities that some uniform way was needed to judge the degree of mental ability of a child. In response to this need, and at the request of the French government, Alfred Binet developed a series of intellectual problems that led to our present-day measures of intelligence.

The work of Binet was reviewed with earnest enthusiasm in the United States, and his tests were translated from French into several English versions, of which the most noteworthy, by far, was the *Stanford-Binet*. The *Stanford-Binet Intelligence Test* was first introduced into the United States by Louis Terman in 1916. Testing seemed to fit in with the mood of Americans, and it became an in-

tegral part of the American way of life and unequaled anywhere else in the world.

WHAT DO THE SCHOOLS MEAN BY STANDARDIZED TESTS?

Anyone reading this book has probably had experience with a standardized test—that is, a test that may be administered to a large group of people or individually and always under the same conditions. The allotted time is always the same, and the answers to the questions are always scored in the same manner. Most people have taken tests of this type in school, in the armed services, or when applying for employment.

In the educational life of your child, you will find that he will take many different standardized tests. His teacher may report to you that he has such and such a score on a certain standardized test. You should know that a standardized test is the direct result of the early efforts of persons concerned with testing who sought a uniform method of measuring children's abilities and educational progress.

A standardized test is like a recipe in cooking. If you are going to make a new dish, you need instructions that have proven successful. If you follow these instructions exactly, your efforts should be successful. The elaborate kitchens of many of the leading flour companies have a laboratory atmosphere. The exact ingredients and conditions are reproduced over and over again to insure you, the consumer, of an accurate recipe. In the same way, a standardized test is subjected to rigorous experimentation on groups of children like your own. The conditions of testing and the reading of directions and the scoring are always the same. Thus the child being tested with the same test in Chicago, Illinois, or Chapel Hill, North Carolina, will receive the exact same questions and directions, and his answers will be judged in the exact same way.

Of course, a standardized test is not as reliable as a recipe. The human factors involved make this impossible. They do, however, appraise human behavior and capacity in a more accurate manner than subjective devices, such as a teacher's evaluation.

In more formal terms, a standardized test consists of questions that are factual in the sense that there is an agreed-upon correct answer. Each test is subjected to careful investigation by a preliminary administration, and questions that have been found to be poor are eliminated.

It must be remembered that standardized tests are not yet free of error. Nevertheless, they are superior to the guesswork upon which your own career planning may have been based.

Parents *should not* think of standardized tests as substitutes for teacher evaluation. The teachers' own tests, as well as ratings on class projects and the child's daily classroom performances, are as important as they ever were.

In the past the uncritical acceptance of standardized testing led to many problems. In the years between 1915 and 1930, after a period of initial exploration and experimentation, standardized tests were developed for all the school skills and for the content areas of the school curriculum. During this time there were many converts to these new instruments. Their enthusiasm was contagious, and this caused not only the development of many new tests, but led also to their widespread use. Many people accepted test results unhesitatingly and without a critical eye to the accuracy of the instruments. Many test users in this "boom" period committed grave errors in the name of testing. These errors were made because of the lack of critical appraisal of the tests and a misunderstanding of what the results really meant.

As in many things, Americans tend to jump on the bandwagon of something new, and testing was no exception. However, as is typical of the American way, after a time educators, psychologists, and others became more critical of tests and of the uses made of them. For instance, the use of test scores as a basis for classroom grouping became the subject of bitter attack, and even in some areas today the practice is still being debated. Much of the criticism of tests was directed at specific tests in terms of their objectives and emphases.

This critical period, from about 1930 to 1946, had the beneficial effect of forcing the test enthusiasts themselves to become more discerning to their assumptions and procedures and to broaden their base and approach to the whole problem of testing.

Today standardized tests are used as objective evidence to *supplement* the teacher's subjective judgments. They are considered to be only one of many educational tools in helping your child realize his own unique potential. The chapters following will present and comment on different kinds of standardized tests and what they mean and what they don't mean for your child in his educational and vocational future.

HOW ARE TESTS OF INTELLIGENCE USED TO HELP YOUR CHILD?

2

Intelligence tests may be divided into two main classes: group¹ and individual. The individual intelligence test is administered by a trained examiner to only one child at a time, whereas the group intelligence test can be administered to large groups of children.

The individual intelligence test is usually administered by a psychologist with extensive training in testing children as well as in other areas of psychology. The group test can be administered by a person without professional psychological training. Most counselors and some teachers with educational training in test administration can perform this function.

INDIVIDUAL TESTS OF INTELLIGENCE

In the first chapter we discussed the first test of intelligence developed by Alfred Binet. In the United States this test is called the *Stanford-Binet Intelligence Scale (Binet)*, and has its widest use among school-age children. The *Stanford-Binet Intelligence Scale* was introduced in this country by Lewis M. Terman in 1916 and was revised in 1937 by Terman and Maud Merrill, and has been somewhat further revised by them in 1960. There is a set of tests for each of 20 levels of ability, beginning with tests for the average two-year-old and progressing to levels that differentiate the abilities of average and superior adults.

In order to assist the reader in understanding the types of items in the test, the writer has picked two levels of different points on the *Stanford-Binet Intelligence Scale*² and listed some of the test questions for each level.

¹ The trend today is to call group tests of intelligence "scholastic aptitude tests."

² Lewis M. Terman and Maud A. Merrill, *Stanford-Binet Intelligence Scale: Manual for the Third Revision Form L-M* (Boston: Houghton Mifflin Company, 1960), pp. 83-101. The following excerpts are reprinted by permission of the publisher.

Six-Year Level

1. *Vocabulary*. EXAMINER:³ "When I say a word, you tell me what it means. What is an orange?"
2. *Differences*. E: "What is the difference between a bird and a dog?"
"Wood and glass?"
3. *Mutilated Pictures*. (Five pictures with a part missing) E: "What is gone in this picture?" or "What part is gone?"
4. *Number Concepts*. (Twelve 1-inch cubes) E: "Give me three blocks. Put them here."
5. *Opposite Analogies*. E: "A table is made of wood; a window of _____."
6. *Maze Tracing*. (Mazes—with start and finish points marked) E: "The little boy wants to go to school the shortest way without getting off the sidewalk. Here is the sidewalk. Show me the shortest way."

Twelve-Year Level

1. *Vocabulary*. (Same as six-year level) Words like *brunette* and *juggler* are given.
2. *Verbal Absurdities*. E: "Bill Jones's feet are so big that he has to pull his trousers on over his head. What is foolish about that?"
3. *Picture Absurdities*. (A picture showing a person's shadow going the wrong way is presented to the child) E: "What is foolish about this picture?"
4. *Repeating Five Digits Reversed*. E: "I am going to say some numbers, and I want you to say them backward."
5. *Abstract Words*. E: "What do we mean by *pity*?"
6. *Sentence Completion*. (Sentences are given with words missing) E: "Write the missing word in each blank. Put just one word in each."

The above sample questions and tasks illustrate the types of material that are included in the test. The reader can see that sometimes specific tests are different at each level. Many of the tests at the lower age levels deal with little objects and pictures, whereas at the upper levels the tests are more abstract and verbal in nature. Various tasks call for judgment, interpretation, memory, and abstract reasoning.

In testing a child, the examiner begins at a level where the child with some effort is likely to succeed. The examiner will go back to an easier level if the child fails the tasks and seems discouraged. If the child is successful the examiner will move level by level until the child fails all the tests at a specific level. Once this level has been es-

³ From this point on, *Examiner* will be designated by the letter E.

tablished, the examiner credits the child with the basal age,⁴ at which he passes all tasks and in addition credits tasks passed at more advanced levels. Thus, if there are six tests at each year-age level, a child passing a single test gets credit for two months of mental age. For example:

Bobby S—— passed all tasks at the 5-year level and passed three of six tasks at the 6-year level and one of six tasks at the 7-year level and failed all tasks at the 8-year level. Then the following computation to derive his mental age would be made.

1. Passed all tasks at 5-year level = 5 years basal age.
2. Passed three of six tasks at 6-year level = 6 months credit.
3. Passed one of six tasks at 7-year level = 2 months credit.
4. Failed all tasks at 8-year level = 0.

Mental age = 5 years 8 months.

Bobby's mental age describes the level at which he is performing. This, of course, does not take into account his life age. Bobby's performance in relation to children of his own age is then expressed as an IQ. An IQ has the same meaning at one age as at any other. In order to find Bobby's IQ, the examiner would consult a table to convert the mental age to IQ.

The second major individual measurement of intelligence is the *Wechsler* intelligence test.⁵ This test was developed for adults and differs in organization from that of the *Binet*. The *Binet*, as you remember, is arranged in successive age levels, whereas the *Wechsler* is organized by subtests representing types of tasks. Each subtest has a separate score. These scores are then converted to produce three different types of IQ. They are (1) verbal IQ, (2) performance IQ, and (3) a total IQ.

Recently, the adult *Wechsler* material was expanded to cover children (ages 5 to 15).⁶ The same organization of subjects is used with minor variations.

In our schools today, both the *Wechsler* and *Binet* are given only when other tests and information seem unreliable or in special cases, such as that of mentally retarded youngsters. In the case of mentally retarded children, the *Binet* is usually preferred because of its higher

⁴ The highest age level at which all of the tests are passed. For example, if all tests up to and including the fifth year are passed, and one test for the sixth year is not passed, the basal age is five years.

⁵ *Wechsler Adult Intelligence Scale*.

⁶ *Wechsler Intelligence Scale for Children*.

reliability and longer use. This is especially true with younger children. With children of mental ages of seven or above, both tests seem equally useful.

The time involved in administering individual intelligence tests and the special training needed by the examiner to properly give the tests make it impossible to give each child such a test. However, as stated previously, only a small minority of children need this individual treatment. In the vast majority of cases, the group intelligence test can give us a fair estimate of a youngster's ability, though not quite as accurately as the individual test. In addition, some authorities feel that a printed group test is more appropriate for academic prediction. In the next section we will discuss some of these group intelligence tests.

GROUP TESTS OF INTELLIGENCE

No doubt the reader is aware that most of the intelligence testing in this country is done with group tests. These tests are much like the objective school examination. They are paper-and-pencil tests and usually consist of 75 to 125 multiple-choice items. The student reads the problems to himself and does one question after another within a fixed time limit. In some tests oral instructions are given by the examiner, and in other tests the instructions are read silently by the person taking the test. Usually there is one examiner administering the test to a group of 20 or more students.

Some group intelligence tests have several timed subtests, each differing in types of items, as, for example, vocabulary, number series, or figure analogies. The typical group test is constructed so that a range of school grades are covered, for example, 4 to 6, 10 to 12, and so on.

If your child is in the elementary grades, he will probably mark his responses in the test booklet itself, whereas tests for junior high and senior high school groups have separate answer sheets that can be machine scored.

There are so many group tests of intelligence on the market that a discussion of them individually would be impossible in a book such as this. To give the reader some idea of the items usually found in group tests some examples of common types of tasks are given.

Verbal—Meaning (Vocabulary):

Underline the word that means the *same* as the first word.

QUIET a. Blue b. Still c. Tense d. Watery

Verbal—Analogies:

Hat is to head as shoe is to _____.

- a. Arm b. Shoulder c. Foot d. Log

Sentence Completion:

The sun sets in the _____ and rises in the east.

- a. Summer b. Morning c. West d. End

Reasoning:

Study the series of letters below. What letter should come next?

A B A B A B A B

- a. B b. D c. A d. E

Numbers Series:

What number should come next to continue the series: 1 2 4 7
11 16?

- a. 18 b. 19 c. 20 d. 21 e. 22

Number:

Add the following columns of numbers and underline *R* for right and *W* for wrong.

(1) 16 R W
 38
 45
 99

(2) 42 R W
 61
 83
 176

Arithmetic Reasoning:

Four \$10 bills are equal to how many \$5 bills?

- a. 20 b. 40 c. 10 d. 2 e. 8

Abstract Reasoning:

All four-footed creatures are animals. All horses are four-footed.

Therefore: a. Creatures other than horses can walk.

b. All horses can walk.

c. All horses are animals.

IQ—WHAT IT MEANS AND WHAT IT DOESN'T MEAN

The *Dictionary of Psychology* states that *IQ* (intelligence quotient) = "the ratio of an individual's intelligence, as determined by some mental measure, to normal or average intelligence for his age."⁷

In our discussion of the *Stanford-Binet* we talked about mental age being converted into *IQ*. The actual ratio in getting this *IQ* is the mental age divided by the chronological age (MA/CA). Thus the reader can see that *IQ* is nothing more or less than a formula derived to obtain a measure of an individual's intelligence as measured by a test of intelligence.

The symbol *IQ* has for some people, since its birth, been a magic

⁷ Howard C. Warren (ed.), *Dictionary of Psychology* (Boston: Houghton Mifflin Company, 1934), pp. 141.

term that is in some manner all encompassing and accurate. Teachers and parents for years have labeled children with dogmatic certainty as being bright or dull on the basis of the child's IQ. The fallacy of this assumption is enormous. As the definition states, IQ is the ratio of the individual's intelligence as determined by a test. This means, in a general sense, that intelligence is being defined as that which is measured by a mental test. It doesn't allow for differing types of intelligence, nor are we sure what we mean by this type of intelligence. D. O. Hebb, a noted psychologist, stated in 1958 that Binet "learned how to measure something without any very clear idea as to what it was he was measuring."⁸ Today, some 50 years later, we measure it a bit more satisfactorily, and we can measure it with a great many different techniques, but we are still somewhat uncertain about what "it" is.

In addition to our uncertainty of what intelligence is, there are many errors inherent in test construction, especially in our group tests. Also, factors such as previous schooling and cultural environment play their part in the youngster's ability to perform on a test.

The accuracy of measurement in the group intelligence test, of course, is contingent upon previous achievement. For example, the boy who reads poorly will surely not do as well as the boy who reads well, because in order to answer the question, the child must first be able to read the question.

Today the trend is to label the group intelligence test as a "scholastic aptitude test," because *intelligence test* implies a measure of native ability, whereas in many cases what we are really measuring is the ability of the child to learn in future school situations.

Neither the individual nor the group test is 100 per cent accurate, and parents should remember that such factors as motivation are impossible to measure. Because no single test is a perfect gauge of ability, other tests are usually administered, and considered along with the classroom teacher's comments to give a picture of the whole child. We will have more to say on test score interpretations in subsequent chapters. Suffice it to say for now that *tests are only one measure of ability, and IQ is only one symbol of this ability*. The reader should note, however, that this writer does not mean or wish to imply that IQ scores are worthless, only that they should be considered along with other evidence of evaluation in the total picture of the child.

⁸ D. O. Hebb, *A Textbook of Psychology* (Philadelphia: W. B. Saunders Company, 1958).

Will Your Child's IQ Change?

Studies using the *Stanford-Binet Intelligence Scale* have shown that for young children future prediction of their IQ based on the test at a young age is rather poor. As we go up in years, however, the chances of the IQ staying the same are higher. For most normal children in a typical American environment, a *Stanford-Binet IQ* at age eight or nine provides almost as accurate a forecast of ability as one taken at the end of high school. That is, the relative IQ (*Stanford-Binet*) is approximately the same at the age of 18 as it was at eight or nine years of age.

In group testing we cannot make the same statement. Studies have not shown as reliable results in the stability of IQ scores obtained from this type of test. Thus a group intelligence test should be supplemented by a new test or tests every three years if the child's current ability is to be fairly judged.

What Is the Practical Importance of Your Child's IQ?

As a parent you are vitally interested in the future of your child. In a general way you know that if your child has certain intellectual abilities he can probably succeed in particular types of work. Of course, you also realize that along with this ability he must have proper motivation and education. No parent would expect a child of below average intelligence to become a physician or college professor. On the other hand, you know that if your child has superior intelligence he must channel this ability into proper educational patterns in order to use the ability.

It is best for the child as well as the parent that certain realistic considerations be made concerning the child's ability. In the chapter on test-score interpretation this subject will be covered more extensively. For now, though, we may state that parents who are interested in the happiness of their child will try to guide him or her in appropriate vocational pursuits commensurate with the child's ability.

Several questions then arise in the minds of many parents. For example: What is the relationship of intelligence test scores to academic success? How high is this relationship in various stages of a child's schooling? What does it mean when he takes a test in elementary school, high school, and college? Is school achievement a better indicator of future school success than the intelligence test? In attempting to answer these questions, the results of scientific studies will be utilized.

What Is the Relationship of Intelligence Test Scores to Academic Success?

The relationship of intelligence test scores to academic success is quite substantial. If we look at studies that have been reported, we can see that for the majority of children the intelligence test is an excellent predictor of future school grades. There are, however, still many marked discrepancies, and you as a parent should be aware of these. When we speak of the majority of children, we are not saying *all* children. Thus in the final analysis we must concern ourselves with a particular youngster in a particular school from a particular home. Therefore your child's counselor and/or teacher will on many occasions be able to give you additional facts that may alter the significance of the test score.

How High Is This Relationship in Various Stages of Your Child's Schooling?

Past investigations have indicated that as the child progresses from elementary school to college, the intelligence test has less and less meaning. That is, the intelligence test given in the elementary school can predict academic success better than the one given in high school, and the intelligence test administered in high school is a better indicator than the one given in college. This can probably be explained by the narrowing of the range of intellectual ability among the child's classmates as he progresses up the educational ladder. In the college groups a more restricted range of ability is evident. Thus most college students are high average or above in intelligence, and factors such as motivation, study habits, and previous achievement become more and more important at this level.

Is School Achievement a Better Indicator of Future School Success Than the Intelligence Test?

Investigations have shown that school achievement is as predictive of later school success as an intelligence test, and some studies have shown that school achievement is an even better predictor of future school success. For example, in predicting college grades, studies have shown that the high school record is as reliable as, and many times more reliable than, an intelligence test.

It has been this writer's experience that most colleges utilize all

meaningful data on prospective students. By pooling information on previous school achievement and the individual's test performances they are able to get a more accurate picture of the student. This procedure is more satisfactory than using only one factor—either test scores or high school record alone.

In summary, we can state, then, that there is no question of the high relationship between academic achievement and the child's performance on intelligence tests. Of course, we would expect this, because, as the reader has seen, the intelligence test is made up of items that are school-oriented.

Is There Any Relationship Between Intelligence Test Scores and Income or Social Class?

In my work as a psychologist, I find many parents who are concerned over some of the underlying factors influencing a child's score on an intelligence test. In order to clarify this subject, it might be of interest to review some of the investigations into this problem. We have already discussed such factors as motivation and test construction. Let us now explore the effects of social class and income as they relate to intelligence test scores.

After the first intelligence tests were developed, studies were made involving different types of children and adults. The basic concern was to find differences, if any, in various groups of individuals. Comparisons were made in different age groups, racial, social, and national groups, urban and rural groups, and different income groups. The findings indicated appreciable group differences. Children coming from lower income families tended to score lower on intelligence tests. Children living in rural areas and in the Southern or Southwestern United States, as well as Indian or Negro children, also exhibited generally lower scores. The interpretation of these findings has been a source of heated debate, conflict, and confusion.

The first conclusions or interpretations of these results was that intelligence was inherited. For example, conclusions were made that Negroes or working-class parents had passed on to their children, through heredity, genes of lesser ability than white or professional parents. Today we *cannot state that genetic differences do not exist*. However, many studies have shown that *the environment does influence test scores greatly*.

Studies of Negro children in New York City have shown that those

Negro children who have spent a longer time in New York City tend to have higher IQ scores than Negro children of more recent residence. On the other hand, Garrett has stated that this often quoted study was in error. He states:⁹

. . . differences between New York schools were often as large as differences between length-of-residence groups; measures of variability were often unreported, so that only trends can be observed. Furthermore, this study could not possibly demonstrate that life in New York caused the improvement in score, as the various residence groups were made up of samples of children whose initial status, of course, was unknown.

Other studies, using foster children, have found a higher level of intelligence for Negro youngsters than one would expect from the intelligence or social level of their biological parents.

In September 1961, at the American Psychological Association's Convention, the Society for the Psychological Study of Social Issues stated, in regard to this problem, the following:

The evidence of a quarter of a century of research on this problem can readily be summarized. There are differences in intelligence when one compares a random sample of whites and Negroes. What is equally clear is that no evidence exists that leads to the conclusion that such differences are innate. Quite to the contrary, the evidence points overwhelmingly to the fact that when one compares Negroes and whites of comparable cultural and educational background, differences in intelligence diminish markedly. The more comparable the background of white and Negro groups, the less the difference in intelligence. There is no direct evidence that supports the view that there is an innate difference between members of different racial groups.

Garrett,¹⁰ in reviewing the above, states that Negro-white differences in mental tests are so regular that he feels they suggest a genetic basis.

In the midst of the confusion regarding hereditary differences versus environmental factors it seems safe to conclude that the environment plays a great part in shaping the child's intellectual ability. Even if genetic differences do exist (and the reader can see this is far from

⁹ Henry E. Garrett, "The SPSSI and Racial Differences," *American Psychologist*, 17 (1962), p. 262.

¹⁰ *Ibid.*, p. 260.

a proven fact), there is no reason that parents should accept a fatalistic position—that is, that a child will be bright or dull because of his ancestors. All authorities would agree that intelligence can be improved by environmental factors, and all parents owe this much to their children. The difference of 10 or 15 points in an IQ score may mean the difference between college success or failure, a higher income, and a more useful and constructive life.

HOW CAN TESTS OF SPECIAL APTITUDES HELP YOUR CHILD?

3

In this chapter we will discuss tests of special aptitudes that your school may use to help in the vocational, academic, and artistic guidance of your child. You may remember from the previous chapter that the trend today is to call group intelligence tests *scholastic* aptitude tests. Psychologists and educators place tests of other aptitudes, which are more specific, in a completely different testing area.

In terms of aptitude testing, the basic point to remember is that an aptitude test's main reason for being is to attempt to measure the potential capacity of a youngster. Its job is *not* to measure what has been learned. Its job is to measure what *can be learned*. You as a parent should remember that although aptitudes are generally thought of as being completely apart from training, it is impossible to isolate any aptitude from some kind of learning experience. The term *aptitude* is usually applied to a capacity or ability in a specific field, such as music, art, mechanics, arithmetic, or clerical work.

As a parent you are, of course, concerned with the proper vocation for your youngster. You may have noticed that he likes to fix things around the house, take apart an automobile, build a hi-fi set, play the piano, or spend his time drawing or painting. In a way, these are tests of his vocational aptitudes; however, you may not be in a position to judge the results of his endeavors. Of course, his interest is an important factor, but interest and ability are not always the same. Therefore you need some objective measure to confirm or disprove your impressions and to help you in guiding your child to the vocation suited to his particular talent.

In addition to interest in discovering your child's vocational aptitudes, the school and guidance staff need to know the answers to such questions as "When should your child start in a reading program?" and "Is your child ready to begin his study of algebra?" The school must have meaningful data about its boys and girls. It especially needs to know about their individual differences. Thus information is re-

quired to help in adjusting the levels of instruction to the needs and abilities of its pupils, who, as we know, are quite different in their range of talents. In addition, information on the strengths and weaknesses of each pupil presents a valuable background for individual vocational and personal counseling.

It is extremely important for your child's future adjustment that his educational and vocational planning be made intelligently. There are many cases of educational and vocational maladjustment that could have been avoided if proper guidance had been available. Many times, students at the ninth or tenth grade seem to present no real problem in making vocational decisions. Their plans seem intelligent enough from the viewpoint of the school, their family, and themselves. Others, however, are not as fortunate, and they usually realize it, though there are some who are not aware of their situations. There are many children who when grown may state, "If only I had known." There are other children who may be unhappy about their achievement but have developed a false adjustment pattern because they believe their status is inevitable.

You as a parent can see, therefore, that the school needs not only all possible information on each individual student for program planning, but it also needs to know each child's abilities in order to provide personal counseling. An aptitude test or tests can help in this work. The counselor who has objective data about a youngster's aptitudes can help the child work for a constructive utilization of his abilities. In the pages that follow, various aptitude tests and the reasons for their use will be discussed.

VOCATIONAL APTITUDE TESTS

Aptitude was previously defined as the ability to learn. Thus vocational aptitude tests attempt to measure a youngster's ability to learn in certain occupations. They *do not* pinpoint a person's exact career; however, they do provide answers to such questions as these: "Is it realistic for my son to consider medicine as a career?" "Can my daughter consider a job as a secretary?" "Would my youngster be better suited for a mechanic's position or office worker?" "Should my son go to college, and if so, what type of school—technical or general?"

You and your child's school need to have information on your youngster's aptitudes in order to guide him intelligently into various educational programs and occupations in which he has a realistic chance of succeeding. It is important to remember, however, *that*

aptitude tests will not make the decisions for your youngster but will provide information useful in planning future goals and objectives.

If a youngster who is college material does not prepare for college or if a youngster who is not secretarial material prepares for such a position, not only is he or she harmed, but society has wasted its human resources. Young people frustrated because of poor vocational choice, have lost years of productivity, and have suffered personal maladjustment due in part to their error in vocational choice.

In our review of vocational aptitude tests we will discuss individual tests as well as the test battery. For the convenience of the reader each section dealing with a different type of aptitude test is so labeled.

Clerical Aptitude

Tests of clerical aptitude attempt to measure abilities needed in office work, typewriting, bookkeeping, and related activities.

Psychologists have found that speed and accuracy in perceiving detail are important factors in successful clerical work. Armed with the above information, the test writers devise test questions that are similar to actual job tasks.

As a parent you may wonder what the results of this type of test mean for your youngster. You should keep in mind certain considerations before you award your daughter the prize secretarial job or decide that she'll never make it because of her scores on such a test. First, you should bear in mind the fact that a child who is very careful and proceeds slowly in order to avoid errors may obtain a poor score. On the other hand, a child who worries very little about accuracy and emphasizes speed will finish many more items and may suffer only the loss of a few points for errors. Parents should take the above into account when interpreting a low score, especially when the child performs well on other tests and in school.

The clerical speed and accuracy tests measure only one aspect of clerical aptitude. It has also been found that girls tend to score higher on this test than boys. Moreover, you and your child should remember that duties vary tremendously with the kind and level of each clerical job. Even jobs that have the same name, such as filing clerk or typist, may be different from one company to another, due to the size of the company, the nature of the work, and other specific conditions.

At this point the parent might ask himself the question "Why give this test if there are so many if's?" The reason is that despite the differences in types of clerical jobs, analyses of clerical work indicate

that a high proportion of time is spent in such tasks as sorting, classifying, and sealing envelopes. Thus speed and accuracy in perceiving details are of primary importance for the clerical worker. The important point to remember is that this type of test is useful, but it is not the "last word" in predicting the success or failure of a clerical worker. Of course, this is true with any test. *Examination scores are only indicators along the trail of decision.*

There are other tests of clerical aptitude that combine speed and accuracy with other skills required for clerical work. Some of these measure verbal and numerical ability along with specific clerical tasks.

The results or scores your child brings home on this kind of test are most appropriate when compared with the performance of persons who are actually employed in certain occupations. For example, trained personnel can compare your youngster's scores to that of a group of commercial students, clerical employees, and the like. This will give you some indication of how your child performs on this test as compared with other persons, some of whom are employed in clerical vocations.

The Minnesota Vocational Test for Clerical Workers is one of the better-known tests of clerical aptitude. It has two parts, number checking and name checking. In number checking there are two columns of numbers; in name checking there are two columns consisting of pairs of names. The person checks the two members of each pair to see whether they are exactly the same or different. There is a very short time limit, and the results are scored for speed and accuracy. Items similar to the tasks on this test are illustrated below.

Number checking:

7345	7354
31789	31789
85634	85634

Name checking:

John G. Smith	John C. Smith
The Chase Fuel Co.	The Chase Fuel Co., Inc.
Alger R. MacDonald	Alger R. MacDonald

Another well-known test of clerical aptitude is the *General Clerical Test (GCT)*. On this test there are four separate scores; clerical, verbal, numerical, and a total score. These scores are derived from nine subtests. The first two tests, checking and alphabetizing, were designed to measure speed and accuracy. The verbal score is ascer-

10.6.94

8429

tained by combining spelling, reading, comprehension, vocabulary, and grammar, and the numerical score is obtained by tests of arithmetic, computation, error location, and arithmetic reasoning.

Many more tests of clerical aptitude could be mentioned; however, it is hoped that the reader will gain some insight into their makeup by the two examples illustrated.

Mechanical Aptitude

In this country today the emphasis is on college training, and yet there is a large segment of our student population who, because of ability, interest, or other reasons, will not attend college. These youngsters may have ability in the mechanical area, and they should not be forgotten by their community, for society needs mechanical craftsmen as well as doctors and lawyers. The school that plans programs for these youngsters needs some basis of objective appraisal in selecting students and arranging appropriate courses of study. The mechanical aptitude test can serve this end and other vocational needs very well.

It has been discovered that in some mechanical jobs, the ability to see spatial relationships and the ability to visualize actual objects from a drawing or picture are related to success in that occupation. This includes the ability to see how a whole figure can be assembled from its parts, how an object would appear when looked at from a different point of view, and how movements of one part affect movements of another. Test questions that measure this type of ability will be illustrated later in the chapter, when we discuss test batteries.

It is important to remember that different functions or abilities are sometimes placed under the heading of mechanical aptitude. Some tests, such as mechanical information tests, depend upon past experience with mechanical objects, whereas other tests do not call upon past experience to the same degree. There is also a difference in performance on these tests between boys and girls.

Sometimes parents are confused by the results of high scores on mechanical aptitude tests. Some parents assume that high scores mean their child is destined to be an engineer, and others interpret such results as indicative of lower scholastic ability. Both assumptions are dangerous. First, mechanical aptitude is only one of many abilities an engineer needs to be successful. In addition to mechanical aptitude, the aspiring engineer must have a good background in science and mathematics, as well as general all-round scholastic ability. Secondly, the tendency for some people to think of mechanical ability as the

lowest rung on the scholastic ladder is erroneous. It should be mentioned that a child's doing poorly in school is no reason to assume he will do well in mechanical work. Thus mechanical aptitude test results must be interpreted in connection with other tests and school achievements.

Many varieties of mechanical aptitude tests have been developed. Most, however, fall into two main areas; those that are administered individually and those that require only paper and pencil and can be given to groups of children at a time. The individual mechanical tests are made up of items that require the person to use tools and materials and/or blocks, as well as assembling mechanical devices, such as a push button, a door bell, and so on. *The Minnesota Mechanical Assembly Test* is a good example of the individual type. This type of test is rarely used in the school because of the expensive equipment needed and because it must be individually administered, which is both costly and time-consuming.

The second type of test, the paper-and-pencil tests of mechanical ability, are used much more widely in schools because of their convenience. Among the better tests of this type is *The Test of Mechanical Comprehension*. This test is made up of items consisting of drawings. The items are concerned with the application of physical principles. If your child has not studied physics he will not be at a disadvantage in this examination, because knowledge of mechanical equipment is not being tested. In order to illustrate this more clearly a sample question from *The Test of Mechanical Comprehension* is shown in Figure 1.

TEST BATTERIES

Your son or daughter has probably already been exposed to some type of test battery, and if not, the chances are that he will be before completion of his education. Test batteries have been developed to measure many things, including intelligence, general school achievement, and different vocational aptitudes. We will confine our attention here, however, to the batteries primarily concerned with vocational prediction.

Many studies concerning vocational prediction have been made. In one particular study a group of high school students were given a vocational test battery. Two years after they completed high school a comparison of their educational and vocational situation and their test scores was made. The study revealed that premedical students

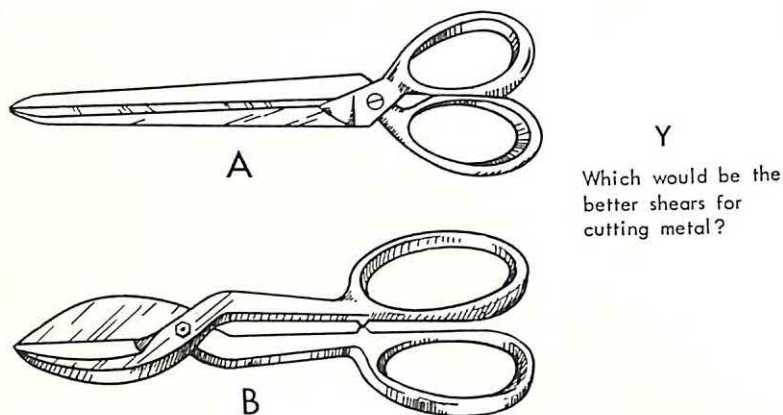


Figure 1 (From George K. Bennett, *Test of Mechanical Comprehension—Form BB*. Reproduced by permission. Copyright 1941. The Psychological Corporation, New York, N.Y. All rights reserved.)

had scored high on all the tests in the battery. Workers in mechanical and electrical trades were above average on the mechanical test and average or below on the other types of tests.

All parents should remember that there is no definite evidence of success or failure based on aptitude tests in specific occupations. However, studies do show certain trends that can give us some clues for vocational guidance. For example, successful persons in skilled trades do well on a particular subtest, whereas successful clerical workers generally have high scores in another area.

Parents should be cautious in interpreting aptitude test results. You must remember that the results are most valid when other tests, such as group tests of intelligence, achievement scores, and the general performance record of your child in school and at home, are taken into consideration.

There are numerous aptitude batteries. The chances are that your youngster will be given the *Differential Aptitude Tests (DAT)* or the *Flanagan Aptitude Classification Tests (FACT)*, because these two tests are presently in widest use. Let us, therefore, look in detail at the *DAT*, which is one of the most widely used test batteries.

This test is used by many schools in place of, or as an addition to, the traditional tests of "intelligence," mechanical aptitude, and clerical aptitude. The *DAT* consists of eight tests. Your son or daughter

may take all eight tests or only a few, depending on his or her particular needs and the school's testing program. These batteries are also used for purposes of counseling and selecting adults for vocational placement. Let us explore each of the tests so that you may get some idea of their content and specific use in vocational and educational guidance.

Listed below are the eight tests of the *Differential Aptitude Tests*¹ and a description of each in language geared for the student. These interpretations are made available to students by the publisher.

Verbal Reasoning

How well can you understand ideas expressed in words?

How clearly can you think and reason with words?

Verbal reasoning is important in all academic and most non-academic subjects in high school. If you were to take only one test, VR would be the best all-around predictor of how well you can do in school, especially in the academic subjects. Students who score average or better should seriously consider college; those well up in the top quarter may consider the highly selective colleges.

Students above the bottom quarter on VR but without a college education may be acceptable for various supervisory and managerial jobs in business and industry. Other things being equal, for instance, the employee with more verbal reasoning ability than his fellow workers has a better chance of being selected for special training in technical work or in supervision.

Students not planning for college who have VR as the peak on their profile should consider preparing for such verbal occupations as salesman, credit manager, order taker, complaint clerk. These job names will help you think of others also in which verbal reasoning and understanding are essential.

People who do poorly on the Verbal Reasoning test should perhaps plan on going into some work that will call for less verbal ability. A person can be successful doing clerical work in an office without trying to become head of a department, or successful doing production work in a factory without expecting to become production manager.

If your scores on one or both of the Language Usage tests—Spelling and Sentences—are an inch or more below the VR on the profile chart, there is a real chance that you aren't able to use your verbal reasoning ability up to its full capacity. Talk with your counselor and teachers about what you can do to improve your writing, reading and other language skills.

¹ Psychological Corporation, *Your Aptitudes as Measured by the Differential Aptitude Test*. Reproduced by permission. Copyright, 1961. The Psychological Corporation, New York, N.Y. All rights reserved.

Numerical Ability

How well do you understand ideas expressed in numbers?

How clearly can you think and reason with numbers?

Numerical ability is especially important in such high school subjects as mathematics, physics, and chemistry.

Students who do well on this test are also likely to do well in the arithmetic and measuring so common in business offices, factories, service shops, and stores.

Scores on this test predict, to some extent, success in nearly all high school and college courses. Numerical ability is one element of all-around ability to master academic work.

An above average score in NA suggests planning for college or other post-high school education. A student who wants to major in such fields as mathematics, physics, chemistry, or any branch of engineering, may expect to encounter some difficulty if his NA score is not in the top third or top quarter.

Numerical ability is also useful in technical careers not requiring a college degree. A score in the second or third quarter on this test, especially if scores on Verbal Reasoning and/or the two Language Usage tests are noticeably *lower* than the NA score, suggests looking at technical training programs either in companies or in training institutes for trades and crafts.

Numerical ability is useful in such jobs as laboratory assistant, bookkeeper, statistical clerk, foreman, or shipping clerk. Many of the jobs in the skilled trades in manufacturing or construction work require considerable numerical ability.

Abstract Reasoning

How well do you understand ideas which are not presented in words or numbers?

How well do you think out problems even when there are no words to guide you?

Using diagrams, the Abstract Reasoning test measures how easily and clearly you can reason when problems are presented in terms of size or shape or position or quantity or other non-verbal, non-numerical forms. The repairman troubleshooting an unusual breakdown, the chemist, physicist, or biologist seeking to understand an invisible process, the programmer planning the work of an electronic computer, the systems engineer—all find this ability useful. Carrying out a logical procedure in your mind is important here.

Abstract Reasoning teams up with the next two tests—Space Relations and Mechanical Reasoning—in prediction of success in many kinds of mechanical, technical, and skilled industrial work.

Students standing high on Verbal Reasoning and Numerical Ability have added confirmation of their college ability if they are also above average on Abstract Reasoning; but, if VR and NA are high and AR

is below average, they usually may rely on the verbal-numerical combination to see them through.

Students scoring rather low on VR but fairly high on AR have evidence of ability to reason in certain ways despite a verbal shortcoming. Vocabulary building, remedial reading, and similar exercises may help strengthen verbal reasoning power.

Space Relations

How well can you visualize, or form mental pictures, of solid objects from looking at flat paper plans?

How well can you think in three dimensions?

Space Relations measures your ability to visualize, to imagine the shape and surfaces of a finished object before it is built, just by looking at the drawings that would be used to guide workmen in building it. This ability makes some kinds of mathematics easier—solid geometry, for example.

To a person who does poorly on Space Relations, an architect's plans for a house or an engineer's plans for a bridge or a machine might look like nothing but several flat drawings. But how about a person who does well on this test? Such a person looking at those same plans can "see" the finished house, or bridge or machine. He could probably "walk around" the finished structure—mentally, that is—and "see" it from various angles.

Students who do well on SR should have an advantage in work such as drafting, dress designing, architecture, mechanical engineering, die-making, building construction, and some branches of art and decoration. A good machinist, carpenter, dentist, or surgeon needs this sense of the forms and positions of things in space.

Students planning for careers not requiring college training should consider their SR score in comparison with their other aptitudes in deciding whether to look for jobs (or training courses) that deal with real objects—large or small, watches or skyscrapers—rather than with people or with finances, for example.

Mechanical Reasoning

How easily do you grasp the common principles of physics as you see them in everyday things about you?

How well do you understand the laws governing simple appliances, machinery, tools, and motions?

Students who do well on the Mechanical Reasoning test usually like to find out how things work. They often are better than average at learning how to construct, operate, or repair complicated equipment. While VR and NA are the best predictors of science and engineering grades in college and technical institutes, a high MR score is added evidence of ability in these fields.

Students who do well on this test but whose VR and NA scores suggest that a college engineering course might be very difficult, should look into opportunities in high school technical courses, ap-

prentice training, and post high school technical institutes. Men in industry who become technicians, shop foremen, and repair specialists tend to be at least average in MR.

People who do poorly on this test may find the work rather hard or uninteresting in physical sciences and in those shop courses which demand thinking and planning, rather than just skill in using one's hands. Many types of work in the construction and manufacturing trades also require one to understand machinery and other uses of physical forces as well as to have manual skills.

Girls score considerably lower than boys on the MR and SR tests. Therefore a girl who does quite well on these tests, as compared with the average girl, may still be far below the average boy. A girl interested in mechanical or engineering work should ask her counselor to figure her MR and SR percentiles in comparison with boys as well as with girls.

Clerical Speed and Accuracy

How fast and how well can you do the paper work that is so important in all offices, scientific laboratories, stores, warehouses, and wherever records are made or filed or checked?

Clerical Speed and Accuracy measures how quickly and accurately you can compare and mark written lists such as of names or numbers. This is the only one of these tests that demands fast work. It is very easy to get the right answer; speed in doing a simple task is what counts. Girls tend to score higher than boys on this test.

While CSA measures an ability that is useful in many kinds of jobs, it is not really needed or expected in most high school courses. In most school work it is more important to do your work correctly than to do it quickly. But a very low score sometimes indicates a source of difficulty with homework or exams.

Have you done well on others of the *Differential Aptitude Tests* but not very well on this one? If so, perhaps you did not work as fast as you could have worked. By practicing, you may be able to speed up quite a bit without sacrificing accuracy on tasks that you understand well.

Aptitude for CSA is important in many kinds of office jobs, such as record-keeping, addressing, pricing, order-taking, filing, coding, proofreading, and keeping track of tools or supplies. Secretaries, whose most important skills must be in stenography and office services, are better if they also can work fast and accurately on routine clerical tasks.

In most scientific research and much professional work mistakes in recording or copying can be very serious. But speed is needed, as well as accuracy. A good score on CSA is desirable, then, for a job handling data in a laboratory as well as for a job in bookkeeping or in a bank.

Language Usage

How well can you use the English language?

How competent are you in spelling, punctuation, capitalization, and choice of words?

Language Usage is composed of two short achievement tests which measure important abilities you need to consider along with the other aptitudes assessed by the *DAT*.

Spelling measures how well a person can spell common English words. Among other things, it is an excellent predictor of ability to learn typing and shorthand.

Sentences measures how well a person can recognize mistakes in the grammar, punctuation, and working of easy sentences. It is among the best predictors of ability to earn good grades generally in high school and college.

While some careers, such as writing and teaching, call for a high degree of competence in English, all careers requiring college-level education require good language skills, and so do most office and managerial jobs in business and industry.

If you do well on both of these tests and on VR, you should be able to do almost any kind of practical writing provided you have a knowledge of your topic and a desire to write about it.

On the other hand, a student fairly high in VR but low on either or both of these two language tests, probably can profit from special study or tutoring in English to bring his language skills up to the level indicated by his VR score.

VR + NA

A Measure of Scholastic Ability

Your combined score on these two tests provides a good estimate of your scholastic aptitude—your ability to complete the college preparatory courses in your school and to succeed in college.

In general, anyone with a rating in the upper quarter (75th percentile or better) should consider himself capable of performing well in college courses. Depending on your current ambitions and your choice of college, a second quarter rating on VR + NA also indicates college potential. Whether students ranking in the third quarter should enter regular liberal arts and science programs is arguable. Are you doing very well in high school? Are you prepared to work harder than your college mates? What college and what courses are you considering? Some students in the third quarter and a few in the fourth quarter who want some post-high school education will find it practical and satisfying to enter one-year or two-year junior college programs in applied arts and sciences, business training, and the like.

Besides predicting academic success, the VR + NA score gives some indication of aptitude for jobs that require more than the average level of administrative and executive responsibility.

It is hoped that the above explanations will give not only some idea of the tests and what they are attempting to predict but also an indication of how they may be used as a resource that parents can use if their son or daughter brings home and discusses his or her scores on the *DAT*.

Tests That Are Used to Predict School and Artistic Success or Failure

The aptitude tests used to predict school and artistic success or failure are called by psychologists prognostic tests. The inquiring parent may rightfully ask: "Is this type of special test better than an academic aptitude test?" The answer is not easy to give. A great many testing people feel that some day the general aptitude test, such as the *Differential Aptitude Tests*, will take the place of aptitude tests designed for special fields. Today, however, prognostic tests have an important place in the school's testing program. Prognostic tests are especially useful in spotting those children who may be able to perform in special academic tasks. The important thing for parents to remember, however, is that special aptitude tests can predict failure more accurately than success, for success is, in part, determined by motivation, social pressures, and other factors. In general terms, we may state that a child with superior intellectual endowment *may* or *may not* be successful in college, but we can be fairly certain that a child with very low ability will be unable to succeed academically. Let us, then, look at some of these special aptitude tests.

Reading Readiness Tests

Reading readiness tests are generally used with children in the beginning of their first year in school. They help the school in gaining some indication of the child's ability to progress in reading. For example, Miss Smith, a first-grade teacher, wants to know which children are ready for reading and which children may have difficulty. Miss Smith decides to use a reading readiness test to help answer this question. Upon reviewing the test scores she finds that some children are ready to read, and others are not. With this knowledge, she can divide the children into groups of similar readiness and have each group work at its own level. She can use the results of the tests as a guide in starting a formal reading program and in deciding what type of prereading activities she may provide for the children.

Parents with young children should not feel that the scores their youngsters receive on a reading readiness test will necessarily be an

indication of the child's final level of reading achievement. A reading readiness test is used mainly to predict the ability of a child to learn from reading instruction in the first year of school and many times only in the first few months. Actually a better source of final reading achievement is an intelligence test. In addition, it must be remembered that each child's rate of development is different. For example, Bill may start walking at an earlier age than his brother Jim—even though Jim may start to talk earlier than Bill. In the same way, some children are ready to read at five years of age, or even sooner, whereas others are not ready until they are seven or eight years old. Also it must be remembered that there is an age difference of as much as 11 months among individual children placed in the same group at the first-grade level. At this age a few months makes a great deal of difference in the physical and intellectual maturity of a child, and thus affects what he is capable of learning.

The main point that you as a parent should remember is that the reading readiness test is one of many tools that the teacher uses in helping to meet each individual child's ability, needs, and development.

There are many reading readiness tests, each having different kinds of tasks. Some require rhyming or matching sounds, and others use oral vocabulary with pictures. For example, in the latter type of problem the child is asked to identify a picture of an object that the teacher names. The teacher may say *cat* and ask the children to circle the picture of a cat from among pictures of a cat, a dog, a horse, and a bicycle. Almost all the reading readiness tests require the child to be able to match figures or simple words by sight: the test item may show a star and beside the star four figures, a star, a circle, a square, and a diamond. The child must be able to "memorize" the star and pick the star figure from among the other four figures to get the item right.

Let us examine one type of reading readiness test and see the kinds of items your child may be called on to answer. *The Metropolitan Reading Readiness Test* is one of the more widely used. It is made up of six tests. The first is called Word Meaning. The person doing the testing would show the child four pictures and call out a word that would identify one of the pictures. The child is then asked to point to the picture that is the same as the word. In the second test the examiner shows the child four pictures, but this time instead of calling out a word, he states a phrase or sentence. The child is then

asked to point to the picture that is the same or means the same as the phrase or sentence. This test is called Sentences. The third test (Information) is similar to the first two tests, except that here the child is called upon to point out objects in terms of what they do. For example, he may be presented with pictures of four objects, including a camera, and then be asked to "mark the one you would take a picture with." The fourth test, called Matching, requires the child to show his ability in recognizing similarities and differences in pictures of objects, numbers, and letters. The fifth test, called Numbers, consists of simple arithmetic problems. In the sixth and last test, called Copying, the child is asked to copy simple forms, numbers, and letters. This test attempts to find out about a youngster's physical and intellectual maturity.

Mathematical Aptitude

For the appraisal of aptitude in mathematics there are many tests, among them tests of algebra and geometry. Mainly these tests attempt to predict how well your son or daughter will do in his or her first courses in algebra and geometry. That is, they are tests used by the school to find out if a child is ready to start higher mathematics. Some children need more work in arithmetic, and many times it is best if they have a year of general mathematics before starting algebra. The results from these tests, plus the child's past academic record and teacher recommendations, help guide the school in placing the child in the course suited to his or her needs and talents.

Many of the tests of algebra aptitude contain problems of addition, subtraction, multiplication, and division. Some have problems dealing with percentages and the use of United States currency. Others have problems that require abstract reasoning and the ability to use simple arithmetical and algebraic procedures. Tests like the *Iowa Algebra Aptitude Test* include all of the above types of problems. This test is divided into subtests, each testing a certain phase of algebra aptitude—abstract computation, arithmetic, and so forth.

Foreign Language Aptitude

In recent years there has been a great deal of attention focused on foreign languages. To assist our schools in helping place children in foreign language courses, the professional test publishers have increased the number and quality of tests in this field. Basically these

foreign language aptitude tests are designed to provide an indication of a child's probable success in learning a foreign language.

Parents may wonder what is actually needed in the way of ability to learn a foreign language. According to most authorities in this field, any person who is able to speak English in everyday life can learn a foreign language, given the time and opportunity to do so. Of course, this statement is too general to have much meaning. After all *given the time* could mean forever. Thus the testing of foreign language aptitude assists in placing students in foreign language study who have the most chance of success. The language aptitude test measures learned capabilities of the child that seem important to rapid success in learning a language.

The guidance counselor in your school will use the results of the foreign language aptitude test in placing your child in a class best suited to his abilities. Of course, as we have mentioned before, the results from one test are never used exclusively. They are used along with other test data and your child's academic record.

One of our better foreign language aptitude tests is the *Modern Language Aptitude Test (MLAT)*. The *MLAT* can be used not only in measuring modern language aptitude but also such ancient languages as Latin or Greek. There are five parts to the test. The first part is concerned with memory. The second part deals with the ability to learn speech sounds. The third part measures sound-symbol association ability and calls for knowledge of English vocabulary. The fourth part is devoted to sensitivity to grammatical structure. The fifth part deals with rote memory. In administering the test a tape recorder is used that presents the instructions and test questions.

Parents should remember that tests such as the *Modern Language Aptitude Test* do not suggest specific languages for study but only that a child has or has not a general language aptitude.

Musical Aptitude

In the fields of music and art, the need for tests that can measure ability is apparent to most parents. Many parents have spent much money on their child's musical lessons only to find out years later that the child is tone-deaf or has little musical ability. There is no single test that can measure the desire of the child to express himself musically or his willingness to practice every day, day after day. In music, as perhaps in no other endeavor, the motivation to stick to the

task and devote time to learning the skills each and every day are necessary. It does not matter how much talent a child has; if he does not have this desire to perform and the ability to stick to it, his talents will never be realized.

In most musical aptitude tests one finds questions that are aimed at discovering perceptive and interpretive abilities—that is, telling the difference in pitch and loudness. In addition, the child is tested in his esthetic judgment of a melody or harmony and a rhythmic pattern. The test most widely used by music educators and our public schools is the *Seashore Measures of Musical Talents*. There are six parts to this test, all of which are on phonograph records, each testing a different aspect of musical ability. In the first test the child is asked to judge which of two tones is higher in pitch. In the second, the child is asked to judge the louder of two sounds. In the third, time intervals are presented, and the child is asked to judge which of two is longer. In the fourth, rhythm is presented, and the child is asked to tell if one of two rhythms is different or if they are both the same. In the fifth, the task is to judge which of two tone qualities is most pleasing. The sixth test is concerned with tonal memory—that is, the child is asked to judge whether two melodies are the same or different. In each test, the judgments become increasingly harder with each item.

Many musicians and other critics have complained that the *Seashore* tests are not related to the musical activities of the musician. That is, the ability to tell fine differences in time and pitch are not needed by the musician. Be that as it may, the *Seashore Measures of Musical Talents* remains our best test of musical ability, and if used with other forms of evaluation, it can give some indication of musical talent. In the final analysis, however, parents should bear in mind that the actual musical achievement and rate of progress of the child is probably the best predictor of future musical achievement.

Artistic Aptitude

In the field of aptitude in visual art, several types of tests are available. There are tests of esthetic judgment, design, and actual drawing. Critics of art tests have admitted that these tests can show differences between art students and other groups. However, they contend that this is so because of achievement rather than ability. Thus they state that we are measuring what the child has learned rather than his ability to learn or do well in the future.

One of the most widely used art aptitude tests is the *Meier Art Judgment Test*. The test consists of items in which there are a pair of pictures of art objects. One picture is a recognized masterpiece, and the other is the same picture with some slight change. The change usually affects the compositional balance of the picture as a whole. If your child were to take this test, he would be asked to choose the better picture in each pair.

Other tests, such as the *Horn Art Aptitude Inventory*, require actual drawings. In this test, lines and dots are given from which the child must make a sketch.

As in the test of musical ability, parents should consider such other factors as the child's interest, his achievement, and his art instructor's rating along with the test results before counseling their children in definite terms.

HOW TESTS OF SPECIAL APTITUDES ARE USED IN COUNSELING YOUR CHILD

Tests of special aptitudes are not given, in general, without good reasons. It is extremely important that the individual child be aware of his assets and limitations, as well as parents and counselors who guide our children in making lifelong decisions. The school counselor works with many different children with different kinds of problems. The results of aptitude tests help him in guiding the "life decisions" of such children as the boy whose level of aspiration is higher than his ability—for instance, the boy with average ability who hopes to be a nuclear scientist; the child whose parents view him unrealistically and aspire for him either above or below his abilities; the child who performs poorly in academic areas but is talented in mechanical ability; the girl with superior intelligence who is not aware of her potential; the boy from a poor economic background who is willing to settle for an occupation below the one he is capable of succeeding in; the child who is thought of as average but whose tests reveal him to be superior; the girl who performs poorly in school and on tests but who excel in the area of clerical ability.

Many more examples could be given. Suffice it to say that aptitude tests can help solve the problems of some of these children and contribute to an all-round picture of the whole child and his present and future happiness as well as benefiting society.

Let us look into an actual situation at Jones High School. Mr. Sanders, the high school counselor, is explaining the use of aptitude tests

at his high school to a group of parents. He has just finished his explanation:

MR. SANDERS: "Are there any questions?"

PARENT: "Yes, Mr. Sanders, I have a question. You said that our school gives algebra and foreign language aptitude tests to incoming freshmen to help place them in the types of courses that are suited to their abilities. Does this mean that if my son does poorly on one of these tests he cannot take these subjects?"

MR. SANDERS: "No, Mrs. Smith, that isn't exactly what I meant. We can only advise you and in the final analysis you and your son must make the decision. Besides, these tests do not mean that your son or daughter should never attempt algebra or a foreign language. What they do signify, however, is that the chances for success or failure, at this particular time, are greater with certain students. And it would probably be best if the child who does poorly on these tests wait at least until his sophomore year before attempting to take courses in the particular subjects. The results of these tests are not to hurt or bar students from their right of education, but only to help them make wise choices that are in line with their talents. In the long run, the child is much happier for he need not experience failure in areas where his talents are not as great."

PARENT: "Do you mean to say that my child hasn't the right to try a subject, if you think he may fail?"

MR. SANDERS: "No, not at all. In a democratic society people have the right to fail as well as to succeed. In the school the same situation is true. The point is that the school attempts to educate everyone and different children have varied abilities. You wouldn't want to push a child into the water who couldn't swim, though it is possible he could learn while in the water—but also he might drown. In the same way we do not want to start a child in algebra if the chances are he will fail. Isn't it best to first teach the child in swimming or in algebra the essentials of these skills before expecting him to perform?"

PARENT: "I see your point. In other words, tests help to determine the most profitable areas of study for the child to enter at this time."

MR. SANDERS: "Exactly, but a child is always given the chance to try these subjects in his second year, or even his first, if he and his parents want to go against the recommendations. Of course, we hope that the parents and child will go along with our recommendations, because the purpose of our tests is not to penalize the child but to help him."

PARENT: "Mr. Sanders, may I change the subject a little?"

MR. SANDERS: "Certainly."

PARENT: "My son's cousin is in high school and he has had aptitude tests in art and music. Why don't you give such tests?"

MR. SANDERS: "We do give tests of musical and artistic aptitude. However, we give this type of test when we feel it is needed. By this

I mean, these tests are not given to all students. They are given only when the counselor feels a student's interests may possibly lie in these areas. Or when a child is interested in discovering his abilities and is not yet sure of what he wants to do in life."

PARENT: "Is this also true for vocational tests?"

MR. SANDERS: "Yes and no. If you mean general vocational aptitude, yes—we do give all our students a test battery that includes tests of mechanical, clerical, and other skills needed for certain vocations. If you mean individual tests of vocational skills—no. For example, your children are given a test battery called the *Differential Aptitude Tests*. This test is given in the freshman year of high school and again in the junior year. This test battery gives us a general idea of the aptitudes your child may have in certain general vocational areas. In addition, it also gives us some idea of his general scholastic ability. This helps us help your child in specific vocational and collegiate planning. If this data isn't enough, then we administer an individual test in, for example, mechanical skill."

PARENT: "Don't you think we are testing our kids to death?"

MR. SANDERS: "No, not necessarily, the more information we have on your child, the better we are able to help him. Tests are not always correct in their assessment of ability. Therefore the more tests given, the less chance of error. Again, let me stress, we give tests only to get information to help us guide your youngster. Of course, there is a point when too many tests can be a waste of time and money. But at Jones High School, we give what is necessary, we feel. As I stated, not all types of tests are given to every child. *Different tests for different reasons are given to different youngsters.*"

Parents will, of course, find that their particular high school may have ideas that are different from those of Jones High School. In addition, money is not always available for the "ideal" testing program. Sometimes parents who live in communities where the school, for various reasons, does not have a complete testing program may want to consult a private or public agency to test their youngster more completely. Many psychologists in private practice offer these services. The interested parent should talk over the idea of more testing with the school counselor or principal, who may be in a position to refer them to an outside source, if a complete testing program is not available.

The important question that each parent should keep in mind is this: "What information is needed to help my child develop himself to his fullest potential?" Aptitude tests will often assist in supplying this information.

HOW DO ACHIEVEMENT TESTS HELP YOUR CHILD?

4

In Chapter 3 we talked about aptitude tests and how they help the school in guiding your youngster. We said that the main objective of an aptitude test is to measure a person's potential, be it in school, at a vocation, or in an artistic field. In this chapter we are going to discuss what a person has already learned and the means of measuring this learning.

The primary goal of an achievement test is to find out the child's past learning—that is, his accumulated knowledge in a particular field. Of course, it is obvious that achievement and aptitude overlap. How can we test a child's ability to learn in school on a group test, in which he must read certain questions or directions, without also testing the child's reading achievement? In the same way, how can we test achievement without also testing the person's capacity or ability? Thus we see that the difference between aptitude and achievement tests is one of degree or objective. When we speak of an achievement test we are thinking of past progress, whereas when we think of an aptitude test we are concerned with future potentialities.

The achievement tests used most frequently by a teacher are those he develops himself. Most teachers and principals, however, find that published standardized achievement tests and batteries can be of unique importance in many areas of the total school program.

A standardized achievement test or battery is an instrument produced by a test publisher for national use. It is developed through the efforts of professional test experts and is designed to examine educational objectives and goals. The standardized test differs from the classroom examination in its scientific development. A classroom achievement test is made up by a teacher for her own pupils and may or may not be used again. The teacher does not have the time, facilities, or training to investigate in a scientific manner the value of her tests. On the other hand standardized achievement tests are run through rigorous scientific procedures to insure their worth.

After the standardized achievement test is constructed, it is given to a sample group of children. The results from these samples are then analyzed in order to find out if the test is measuring the pre-established educational objectives. For example, the authors of a social studies test have decided to construct a test that will measure the student's understanding of the currents of history that led up to the Industrial Revolution. They want to know whether they are measuring this area of knowledge and understanding or whether they are measuring reading ability, spelling, and so forth. In addition, they analyze the results to see if children, upon retaking the test in another form, show similar scores. If they find that the test is measuring their objectives and is doing so consistently, they then consider publishing it.

Thus the user of standardized achievement tests can make broad comparisons between schools or classes or between areas of achievement and aptitude. In addition to the national norms¹ furnished by the test publisher, each school with a complete testing program may develop local norms for that particular school. That is, over a period of years the guidance counselor or principal of a specific school will be in a position to say what the expected scores are for his particular school.

In this chapter we will discuss achievement tests and batteries and their makeup and uses. Standardized achievement tests can be divided into three groups. The first group consists of *general achievement test batteries*, which are tests that cover many of the basic subject-matter areas of a school's program as well as study skills. These tests are similar to TV dinners, which need only to be heated to be ready for use. The general achievement test battery serves the same purpose, though probably better. The school does not have to administer separate tests, nor does it have to scan the market for tests in each subject field. The authors of the general batteries attempt to produce an instrument that will cover the general needs of an achievement testing program for our schools. This type of achievement test is used in the elementary schools through high school and even at the college level.

The second kind of achievement test is one that covers single subject areas, such as social studies, science, or mathematics.

The third form of achievement tests is one that limits itself to specific areas within general subject-matter fields, such as ancient history, biology, and algebra.

¹ Norms are the usual distribution of scores expected of a particular group. Groupings may be according to age, grade, occupation, and so on.

In general the schools, especially the elementary schools, use the general achievement battery for their achievement testing. In this chapter, we will therefore, focus most of our attention on achievement batteries.

ELEMENTARY-SCHOOL ACHIEVEMENT BATTERIES

In the first three grades of school, achievement batteries concentrate upon the skills needed in reading, arithmetic, and language. In the intermediate and upper grades content subjects, such as social studies and science, receive more attention. Test batteries find their widest use in the upper grades of the elementary school. Therefore we will concentrate our attention on achievement batteries designed for this level, because in a book such as this, space does not permit a detailed explanation of tests at all levels of the elementary school.

Most of the widely used achievement tests for the upper grades measure word knowledge. Different tests, however, vary in the way in which they appraise this ability. Some measure vocabulary only in the context of a paragraph, whereas others test vocabulary separately. Still others provide both—that is, paragraph reading and a separate section on word knowledge.

All of the tests examine reading ability and arithmetic skills. The tests of reading vary in types of test questions. Some are based on passages from 50 to 100 words, with two or three questions on each passage. Others have a small number of long passages (500 or more words), with as many as 20 test questions referring to a single passage.

In the area of arithmetic, one finds older tests consisting of computational skills, such as addition, subtraction, and multiplication as well as problem-solving items, in which the problem is stated in words and must be read to be solved. The new tests have, in addition to the above, arithmetical concepts and understandings. That is, there is emphasis on meanings and understandings of arithmetic rather than simply mechanical skills. This, of course, reflects the new concern in teaching arithmetic. Educators are now striving to teach students more than the mechanical method of adding two plus two. They want their students to know not only that two plus two equals four but also why two plus two equals four. Of course, in measuring arithmetic skills it is difficult in the area of problem solving (problems written in words rather than in numbers and signs) to distinguish problem-solving skills from the influence of reading achievement. It seems that it is impossible to isolate completely one skill or achievement area from

another skill. This is why educators often state that reading is the most important skill for success in school.

Another common test in the batteries is the measurement of the child's use of language. Of course, the different batteries vary in detail, but generally they cover punctuation, capitalization, grammar, and spelling. As in most standardized tests, the child is presented with questions in multiple-choice form. He must decide on one of the answers listed in the test. For example, in spelling the child may be asked to decide if a word is spelled correctly or incorrectly. In some tests he may be asked to correct misspelled words. But usually his only writing on the test is to put a mark or check by the answer of his choice. The English teacher is not always happy with this type of test. Often he would prefer to test writing ability through an actual sample of writing. The test author and publisher can understand the English teacher's preference, but are faced with the tremendous task of attempting to evaluate objectively individual samples of writing. The only test that the author knows of at this time that attempts to do this is the *Sequential Tests of Educational Progress (STEP)*.

In the more recent tests there are subtests that attempt to measure study skills—that is, what knowledge and skills the child possesses in obtaining information. The current educational approach of assigning group or individual projects and asking the student to gather information from different sources has influenced the formation of this type of test item.

The major achievement batteries differ in the matter of including tests dealing with actual content fields. Tests in content fields are less prominent today than they were 25 years ago, the feeling being that specific subject objectives and content vary from school to school, whereas skills tend to be more universal. In the fields of science and social studies there is more common ground, but there is still a wide difference in each school system. Some tests have attempted to meet this challenge by dealing with reading and study skills. That is, the student is not tested so much on his information or specific knowledge in social studies or science as on his ability to comprehend and work with ideas in the subject field.

Some of the major tests that are widely used in the schools of our country to measure achievement are the *California Achievement Tests*, *Iowa Tests of Basic Skills*, *Metropolitan Achievement Test*, *Sequential Tests of Educational Progress*, and the *SRA Achievement Test*. Most of these tests reflect the subject areas and concepts that we have

discussed. In order to illustrate some typical questions found on the general achievement battery for the elementary grades the reader will find listed below sample questions in some of the areas that are covered on the *SRA Achievement Series* for grades 6 to 9.²

Using Sources of Information

DIRECTIONS: This is a test to see how well you can use reference materials. Some of the questions ask about which source you would use; the other questions ask about what is in a certain type of reference book. There is only one correct answer to each question. Now read the sample question below.

- (1) If we wished to find something about Abraham Lincoln, which of these would be best to use?
- a. A magazine.
 - b. A newspaper.
 - c. A history book.
 - d. A spelling book.

Another part of this test is designed to test your child's ability to use a table of contents. The child is presented with a table of contents and asked questions such as:

- (2) The table of contents tells us that trouble with the law is discussed in
- a. Chapter I.
 - b. Chapter II.
 - c. Chapter III.
 - d. Chapter IV.

Reading Charts

DIRECTIONS: This is a test to see how well you can read graphs, tables, and maps. First, glance at the chart in order to get an idea about its contents. Then read each question and refer back to the specific graph, table, or map to decide which *ONE* of the four possible answers is correct. There is only one correct answer to each question.

Figure 2 is a sample graph. It indicates the number of words that Bob spelled correctly on each of ten days in April.

- (1) We can tell from the graph that Bob had 15 words correct on
- a. Monday, April 1.
 - b. Tuesday, April 2.
 - c. Wednesday, April 3.
 - d. Thursday, April 4.

² Reprinted by permission from *Achievement Series 6-9, Form A*, by Drs. Louis P. Thorpe, D. Welty Lefever, and Robert A. Naslund. Copyright 1958, Science Research Associates, Inc.

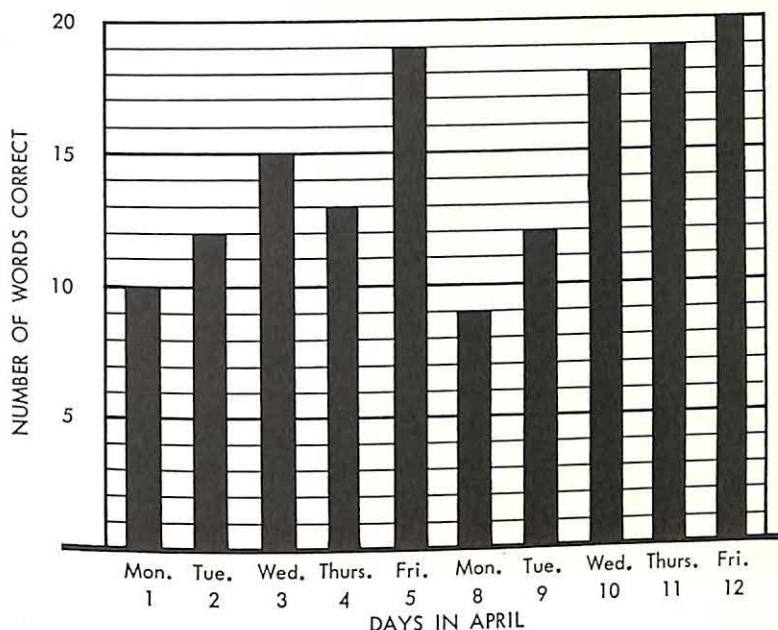


Figure 2

- (2) How many words did Bob have correct on Thursday, April 11?
- 13.
 - 18.
 - 1.
 - 19.

Reading

DIRECTIONS: This test has stories in it. It is a test to see how well you can read. Each story has some questions for you to answer after you have read the whole story. Here is a sample story.

A DOG HERO

Barbara and Henry have a big, brown dog named Jack. They think he is a smart dog. One day their baby sister, Sally, was playing near the river which flows back of their house. Barbara and Henry had been told by their mother to watch their little sister. However, they were soon playing so hard they forgot all about Sally.

Suddenly they heard a cry and a splash. Sally had fallen into the river. Before they could call for help, Jack jumped into the river and pulled Sally to the bank. Their mother came running and soon held her baby safely in her arms.

- (1) This story is about
 - a. A boat ride on the river.
 - b. A beautiful dog.
 - c. A brave dog.
 - d. A child who was afraid of the water.
- (2) After Jack saved little Sally from the river, Barbara and Henry
 - a. Were proud of their big, brown dog.
 - b. Were afraid to go near the river.
 - c. Wouldn't play with Sally any more.
 - d. Wouldn't let Jack out of their yard again.

Arithmetic Reasoning

DIRECTIONS: In the first part of the arithmetic test you will find arithmetic stories, and then some questions about the story. Here is a sample story.

Sam had six puppies at home just five weeks old. He decided to give his cousin, Betty, one puppy and to keep one for himself. He sold the rest of the puppies for \$2.25 each.

First of all, we want to know whether you understand the story. So here is the first question.

- (1) In this story, *we are told*
 - a. How many puppies Sam sold.
 - b. How much Betty gave him for her puppy.
 - c. How much money Sam received altogether for the puppies he sold.
 - d. *None of these.*
- (2) Before we can figure out how much Sam received for the puppies he sold, we will first need to figure out
 - a. How old the puppies are.
 - b. How much Sam got for each puppy.
 - c. How many puppies he sold.
 - d. *None of these.*

Arithmetic Concepts

DIRECTIONS: The next part of the test will give you a chance to show how well you understand some important facts about arithmetic.

Here is one type of question that is asked in this part of the test.

- (1) One hundred two is the same as
 - a. 102.
 - b. 12.
 - c. 1002.
 - d. *None of these.*

Here is another type of question appearing in this part of the test.

(2) Which is longest?

- a. 1 yard.
- b. $3\frac{1}{2}$ feet.
- c. 1 meter.
- d. 32 inches.

Computation

DIRECTIONS: In the last part of this test you will have a chance to show how well you can work with numbers. Here are two sample questions.

(1) 15 a. 44.

14 b. 35.

+ 16 c. 55.

d. None of these.

(2) Add $\frac{1}{2}$, $\frac{2}{3}$, and $7\frac{1}{2}$.

a. $7\frac{5}{12}$.

b. $8\frac{1}{2}$.

c. $8\frac{5}{12}$.

d. None of these.

HIGH-SCHOOL ACHIEVEMENT BATTERIES

At the high school level you will find more specific tests in particular subject fields as well as the general survey battery that is also used at the pre-high school level. The variety of courses offered at the high school level makes the job of constructing a complete high school battery difficult. The authors of most high school achievement batteries therefore, confine themselves to testing such subjects as English, social studies, science, and mathematics. The battery can help the child in making decisions about courses in high school, but the reader should remember that they are rough gauges and should only be used along with other test data in formulating educational plans. Let us look at some of the batteries and tests designed for the high school level.

The *Cooperative General Achievement Tests* attempt to measure general knowledge in the fields of social studies, natural science, and mathematics. Each test has a section on vocabulary knowledge in its field as well as a section devoted to testing comprehension of the subject and critical thinking. Another test that is widely used but differs from the *Cooperative* in content is *The Iowa Tests of Educational*

Development. This series tests a child's achievement in 10 areas, some of which are understanding of basic social concepts; general background in natural science; and ability to interpret reading materials in natural science. This kind of test is designed to produce objective evidence of conceptual thinking rather than factual information. A test that measures actual academic achievement and is used for testing immediate objectives of instruction is the *Essential High School Content Battery*. Four fields are covered: mathematics, science, English, and social studies.

The above batteries all have in common tests of specific fields of knowledge. Parents should be aware of the fact that many times standardized achievement tests do not indicate a child's progress in a specific subject field as well as his grades in school do. This is because schools differ in their objectives and educational philosophies and thus require different degrees of proficiency in the subjects covered on these achievement tests. We will have more to say on this when we discuss the reasons achievement tests are used. Some of the different types of questions that are contained in these series are illustrated for your inspection.

Mathematics:

- (1) The sum of 20 and 20 is
 - a. 0.
 - b. 40.
 - c. 50.
 - d. 20.
 - e. 10.

Science:

- (1) Usually the unit for measuring the loudness of sound is the
 - a. Vibration.
 - b. Wave.
 - c. Frequency.
 - d. Decibel.
 - e. Tone.

Social Studies:

- (1) The President of the United States during the Civil War was
 - a. Andrew Johnson.
 - b. George Washington.
 - c. Robert E. Lee.
 - d. Ulysses S. Grant.
 - e. Abraham Lincoln.

Language Usage:

- (1) Which of the following sentences is *correct* and which is *incorrect*.
- I ain't going to the show.
 - Neither John nor I went to the ball game.

In addition to achievement batteries, tests in specific subject areas are also given to high school students. One of the more widely used tests in the field of English is the *Cooperative English Test*. It examines your child's knowledge in the areas of mechanics of expression, effectiveness of expression, and reading comprehension. There are other tests in English, such as the *Iowa Language Abilities Test*, which emphasize vocabulary, capitalization, punctuation, and other related English skills.

In the area of social studies standardized achievement tests are available in specific subject fields, such as civics, ancient history, world history, American history, and American government. The *Crary American History Test* is a good example of a test that attempts to measure the achievement of youngsters in American history. This test contains questions dealing with factual information, understandings of historical processes, skill in reading maps, and so forth.

In the field of science, tests covering the specific fields of general science, biology, chemistry, and physics are available. The *Cooperative Science Test* is one of the better tests available in the area of general science. This test is made up of questions dealing with informational background and terms and concepts in general science as well as questions that test the student's ability to apply ideas from scientific reading selections.

Specific achievement tests in mathematics cover a wide range of subjects, such as general mathematics, algebra, plane geometry, solid geometry, and trigonometry. The field of mathematics, because of its exact and objective nature, lends itself well to standardized testing.

WHY IS YOUR CHILD GIVEN ACHIEVEMENT TESTS?

The great majority of children sometime during their years of schooling will encounter achievement batteries or tests. What do the results mean for the future life of your child? Why does the school administer this type of examination? Various things are done with the scores children receive on achievement tests. Let us examine four major reasons for their use.

TO HELP UNDERSTAND YOUR CHILD. In order to properly guide a youngster an understanding of his level of achievement is extremely important. The counselor or teacher must know the educational achievement of a child to help the youngster plan for his future education, possible remedial help, and eventually his or her life's occupation. Let us look into an actual counseling situation, where Mr. Smith, the junior high school counselor is talking to Bob Fein, an eighth-grade student, who is considering his future high school program.

MR. SMITH: "Well, Bob, how can I help you today?"

BOB: "I'm not sure what courses I should take in high school, you know, whether I should start with algebra or not and so forth."

MR. SMITH: "Well, how do you feel about it?"

BOB: "I don't know. My problem is this: you told me that I was above average on my aptitude tests in arithmetic and science, but yesterday you said that my achievement tests were not as good. Now, does that mean that I should not take algebra and science my first year in high school?"

MR. SMITH: "How have you done in your class work?"

BOB: "Oh, just fair."

MR. SMITH: "I see. Just fair?"

BOB: "What I mean by 'just fair' is a little under C."

MR. SMITH: "Well, let's examine your whole record, both your test scores and school grades. It seems that you have above-average ability in most areas. However, your class work is below average, and the achievement tests show that you are a little below grade level in reading, arithmetic, and science. Thus it looks like you have the ability to learn, but you haven't been applying yourself."

BOB: "Are you saying, Mr. Smith, that I haven't learned as much as I should have by this time?"

MR. SMITH: "Yes, in a sense I am saying that. What do you think?"

BOB: "I . . . I don't know. My parents say that I don't study enough. Could this be the reason?"

MR. SMITH: "It may well be. On the other hand, there could be other reasons."

BOB: "I guess so, but what should I do as far as my high school program goes?"

MR. SMITH: "The final decision, of course, rests with you. I can point out some general guidelines that may be of help. First, there is no doubt that you have the ability to do average or above-average work in school. Secondly, your class record and achievement scores indicate that you are below your grade level in some important areas of education. This means that even though you have the ability to learn algebra and science, your lack of progress in these areas may

prevent you from doing well in these fields in high school. I would recommend, therefore, that you put off algebra and biology until the tenth grade and concentrate on making up your learning deficiencies by taking general math and general science your first year.

BOB: "My parents won't like that, especially since all my friends are starting with algebra and biology. My parents and friends will think I'm stupid, won't they?"

MR. SMITH: "The important thing, Bob, is that you know that you are not stupid. Besides, your future education will benefit by a firm grounding in the essentials. If you take algebra and biology and fail, how will you feel then?"

BOB: "Not very good."

MR. SMITH: "Of course not. You see, Bob, ability and achievement are, many times, quite different. I am sure you know of guys who could make outstanding baseball players, but never perform well because they haven't learned the basic skills in playing the game. If you take a guy who might be another Babe Ruth and put him in the major leagues before he is ready he may never realize his potential. On the other hand, if you put him in the minor leagues and give him the experience to learn, he may become another Babe Ruth. In the same way, if you have the ability to do well in algebra and biology but lack the learned skills, you need some experience in the minor leagues—that is, general math and general science—before you come up to the big leagues. Then you may become a major league performer. Do you understand what I mean?"

BOB: "I think I do. In other words, you are saying that by trying a subject that I am not ready for, I may fail it."

MR. SMITH: "Yes, not only is there a good chance of your failing, but more important, your failing or having extreme difficulty in passing may close that door of learning to you forever. That's one of the reasons we give achievement tests. We want to know how ready you are to learn new subjects based on your past learning."

BOB: "Thank you, Mr. Smith, I will tell my parents what you said."

The case of Bob Fein is, of course, only one example of the use of achievement tests in understanding the individual child and helping him to understand himself. From this example we can see the practical importance of achievement tests and also their use along with other tests.

TO HELP IDENTIFY CHILDREN FOR INTENSIVE STUDY. Another reason for giving an achievement battery is to help distinguish those children who need individual attention. Of course, every child should be studied as an individual, and most schools attempt to do this. But in every school system, there are those children who need special help more than their classmates. Many times these children

are difficult to distinguish from the others, for often they do not ask for special help, and perhaps neither they nor their parents are aware that they need individual attention. One way of finding out who these children are is to administer an achievement battery. This type of child is sometimes first identified by his or her poor performance on a standardized achievement battery.

The child who needs intensive study may show great differences in his performance on different subtests, or he may perform far below his grade or age level. Sometimes his performance, as in the case of Bob Fein, is far below his capabilities, as shown by a group intelligence or aptitude test. Of course, you as a parent should remember that these things are only indications of possible problems. The actual problem and cause of it must be studied in detail. The school counselor or teacher, in studying your child's test performance, thinks of the following questions:

1. Is his educational achievement related to his aptitude—that is, is the child falling behind the level we should expect of him?
2. Does he have a reading problem? If so, do we have an indication of the child's academic aptitude based on a nonreading test?
3. Does he have a problem in some specific school subject? If the answer is yes, further study and testing may be needed.

Not long ago a 15-year-old boy in the tenth grade was referred to me because of marked differences in his various test scores in addition to his poor school record. The boy had excellent scores in some of his aptitude tests, such as mechanical reasoning, abstract reasoning, and space relations. His other aptitude scores were extremely low. His group intelligence test showed an IQ at the level of mental retardation. His achievement tests showed great differences, such as a very low score in social studies, an extremely high score in mathematics, an average score in English, and an extremely high score in science.

I decided that an individual intelligence test and a reading achievement test were needed. The results of these tests showed that the boy was in the superior range in intellectual ability and was equal to first-year college students in reading achievement. After these tests were administered the boy was referred to a school social worker for further study. During the counseling sessions with the social worker, certain facts of the boy's life were obtained. It developed that this boy's parents, who were both physicians, had been killed in an automobile

accident when the boy was 12 years of age, and since that time he had been living with his uncle.

When confronted with the results of his test performances the boy admitted he had not tried to do his best on certain tests because "I didn't feel they meant anything anyway."

I now knew that circumstances outside of the boy's abilities were affecting his performance both in the classroom and on standardized tests. I asked myself certain questions: "Why does he feel certain courses are not important?" "Is there a relationship between the auto accident and the loss of his parents to his scattered performances?" These and other questions had to be answered before any progress could be made in counseling the boy. I therefore decided to administer some personality tests (see Chapter 5 for explanation of projective and personality tests).

The test results revealed a boy who was suffering from a "burnt child reaction." That is, the trauma of his parents' deaths had acted on him as though someone had pushed him over a cliff. The boy had probably always had personality problems and had always been near the edge of the cliff. The push or shove was the auto accident and the ensuing deaths. He now felt that his goal in life was to replace his parents by becoming a physician himself. This, of course, was understandable. However, the child lost sight of reality in thinking that he could become a doctor without passing courses not directly related to the sciences. This is why he did not work in social studies and did not attempt to do well on achievement tests outside the scientific areas.

Through the use of tests and interviews a clearer picture was obtained of this boy's problems, which were interfering with his ability to learn and perform in school. In counseling sessions he was helped to think more realistically about his goals and the means of obtaining them. This is an example of a boy whose vocational goals were in line with his aptitudes but who was unable to harness his abilities in all school subjects because of emotional problems.

Of course, the above case is rather rare in the public schools, for most children do not experience the shock of losing both parents. However, it is not rare for a child to be placed in a grade or level below his abilities because of poor achievement. Quite often this inability to use his potential is due to emotional problems. A careful comparison of the child's achievement test scores with his scores on aptitude and intelligence tests can help to identify those few youngsters who need intensive study and help.

A much more common occurrence in the use of achievement tests is the case of Johnny. Johnny was a 10-year-old beginning the fifth grade. The achievement tests showed that he had made little progress in his first four years of school. His reading ability was at the second-grade level, and all of his other test scores reflected this deficiency. Johnny was referred to the reading specialist, and further testing was done. Johnny's problem was caused neither by emotional strain nor by lack of ability; his individual intelligence score showed he was of average intelligence. Johnny's lack of educational achievement was due to two factors. First of all, he had a hearing defect, which interfered with learning in the classroom, and secondly, he was suffering from a far-from-rare problem called mirror reading. Mirror reading is a condition in which the child sees letters backward. Of course, these factors hampered Johnny's learning progress. Once the problem and its causes were known, proper measures were taken to help Johnny catch up to his fellow fifth-grade students.

TO HELP THE TEACHER IN PLANNING PROGRAMS WITHIN THE CLASSROOM. In the fall of each year, teachers in most schools encounter new students. The teacher is usually given a set course of study within which he must plan a program of instruction for all the children, as well as providing for individual children in the group. Decisions concerning various subject fields must be made, as well as how much time should be given to a review of the previous year's work. In addition, the teacher is faced with the problem of planning independent work for those children capable of going beyond the regular classroom course of study. Most teachers want to form groupings within the class so that students of similar abilities and skills can work together at a common level.

In order to carry out these educational plans and goals, the teacher needs to know his students' abilities, skills, and past learning achievements as soon as possible. One way to do this is to administer an achievement battery. The results of the tests will give the teacher an indication of the relative achievement level of his group of children—that is, whether the group is superior, average, or below average in the basic skills he will attempt to develop. The scores will provide clues as to the group's strengths and weaknesses. The teacher can then adapt his plans to the group as a whole and to the individuals within the group. Thus the teacher can single out those children who can profit from more challenging tasks than the work that is presented to the whole class. At the same time, he can plan to arrange for materials

that will meet the needs of those children who are not quite up to the achievement level of their class and who may need special help in the classroom or the assistance of a special teacher for remedial instruction.

Of course, tests themselves are only one indication or clue for the teacher. The good teacher, in addition to using the results of tests, obtains certain impressions of his students by contact with them. The deepest understanding of an individual child comes only through working with that child. Test scores, however, enable the teacher to have an objective frame of reference in addition to his subjective estimation of the group and the individual child.

TO HELP THE PRINCIPAL IN PLANNING PROGRAMS WITHIN THE WHOLE SCHOOL. In order to provide the best possible education for your child a school must always examine and reexamine its curriculum and system of instruction. The achievement battery is used as an aid in the evaluation of the curriculum. The results of the tests provide some indication of how well a school or school system is doing in relationship to other schools. For example, Roosevelt Junior High School wanted to find out how their students' test scores compared with the scores of other children throughout the country. To find this out, Roosevelt averaged their children's test scores and compared them to the national averages provided by the test publisher. In science and social studies they found that their average student was one grade level below the national standard or average. In mathematics and English they found that their students were above the national average. From this they were able to find the weak spots in their programs of instruction.

Of course, there are certain dangers in using this method for evaluating a school's course of study. First of all, this type of evaluation does not give a complete picture. The achievement battery or test can only evaluate those skills and knowledge that it covers. Usually these skills are only a small part of the total objectives of our modern school. A danger that is always present in this kind of evaluation is the relative simplicity of giving objective tests and then stating whether or not the curriculum is up to standard. Good school systems use other methods of evaluation in addition to test results, which enables them to gain deeper insights into the whole school program.

A second caution that must be remembered before a critical evaluation of a school's instructional program is made is the problem of local goals and objectives. It would be unfair of a parent to say that

his child's school is no good because the students are below the national average. A particular school may place greater emphasis upon certain subjects or delay others because of their particular situation and educational philosophy. For example, one school may stress meanings and understandings of subject matter rather than factual knowledge. If such a school uses an achievement battery that emphasizes factual content, their students may do poorly; yet this does not mean that the school is necessarily doing a poor educational job. The difficulty with national achievement tests is the problem of making the questions appropriate to most schools in the country. Because the curricula of our schools are not controlled by a single administration, this is a difficult job. Therefore, each school must use the battery in the light of its own particular goals and instructional program.

A third caution in making generalizations about achievement test results concerns the geographic location of a school or school system. Schools and communities differ in their social and economic levels. Related to these differences are the ranges of abilities of students in the public schools. These factors must be taken into account when achievement is considered. Many times this is done by developing local norms for the school or school system. For example, students who attend schools in the north suburban areas of Chicago generally come from privileged homes. By that I mean they come from families who are financially well-to-do, who have a fairly high cultural level, and who are able to provide their children with experiences that many American families cannot afford, such as visiting the many museums in Chicago, attending plays for children, or attending the children's concerts of the Chicago Symphony Orchestra. In this kind of area the average student does better than the average student in other areas of the country. If the local schools in this area applied only national averages, they would not have a complete picture of their instructional programs. But by establishing local averages they can get a picture of how well the child is doing as compared to his fellow students, who share similar backgrounds and experiences. For the same reasons, an underprivileged area in Chicago, or elsewhere in the country, may want local averages, as well as national averages, on the tests they use in their schools to obtain a more complete picture. The underprivileged area, by using local averages, can tell the relative progress of their students who start out with so much less than the average national student in abilities, motivations, and experiences.

In addition to curriculum evaluation, achievement batteries are used for other administrative functions. A principal may ask one of his counselors to administer an achievement battery in order to obtain information on a new transfer student. This helps the school in placing the new student in courses that are in line with his previous achievement.

Some schools use achievement batteries to evaluate their teachers. The teacher is judged by the performance of his class on the achievement tests. Obviously, this procedure has many shortcomings. For example, it fails to consider that the achievement of a class is related not only to the teacher's ability but also to the group's past educational history. It does not seem fair to this writer to hold a teacher solely responsible for his group's present achievement level. Secondly, as we have stated before, achievement is based in part upon aptitude as well as experiences not gained in school. Of course, if the person evaluating the teacher takes into account the group's basic aptitude and social and economic level, a more reliable estimate can be made. However, few evaluators have the time, training, or inclination to carry out such a procedure. Thirdly, as we have said before, an achievement battery can measure only a small portion of the goals of our schools today. As a parent you should remember that the score or scores your child obtains on an achievement test will have the most meaning when used in conjunction with other tests and information. Again, it is important to remind ourselves that achievement tests are only part of the school's educational and testing program. They do not tell the whole story, only one aspect of it.

HOW DOES THE SCHOOL USE INTEREST AND PERSONALITY TESTS?

5

In the last three chapters attention has been focused on tests that relate to academic performance. We have discussed intelligence, aptitude, and achievement. These are the basic ingredients of school life. They are not, however, the only elements essential to success in school or life. The child (and the adult) must also be able to harness his talents in fields that satisfy his needs. The problem of vocational choice is of paramount interest to parents who want their children to be happy and to the society that needs to utilize the resources of its people. This is where interest inventories may be of assistance.

In addition to helping children become aware of their interests the school is also concerned with the mental health of its pupils. A child with an emotional problem is sometimes unable to use his abilities and becomes a school failure or dropout. The school is, therefore, vitally concerned in helping its boys and girls find their interest areas and spotting those children who need psychological guidance. Thus this chapter will be devoted to assisting the parent in understanding the nature, use, and reasons for interest and personality tests in the school.

INTEREST INVENTORIES

Each child makes a variety of decisions regarding the type of activities in which he will participate. Some children show preferences for sports, and others spend their time in reading or pursuing such hobbies as building model airplanes. Thus each child shows a preference for some activities and little interest or even aversion to others. The word preferred by testing authorities in this area is *inventory* rather than *test*. This is because they are not tests in the sense that a person passes or fails, but are actually a recording of his likes and dislikes. *The measuring of these tendencies to like or dislike certain activities is the main objective of the interest inventory.*

Many parents may ask themselves the question "Why should my child's interests be spotted?" The answer is that interests are related to academic success, job satisfaction, and eventually adjustment and pleasure in life. For these reasons it is important that every child have an understanding of his relative degree of interest in various activities. The counselor in helping the child wants the answers to such questions as: What are the interests of this child? How does the child's interest in science compare to his interest in social activities? How does his interest in a certain type of activity compare to those of other persons?

But why give interest tests when all one has to do is to ask the child his likes and dislikes? Certainly this is a valid question. No one knows John as well as John knows himself. John may state that he likes arithmetic or wants to be an engineer. Of course, these are expressions of interest, but how valuable are they? The answer is that they are of limited value. Authorities investigating this problem suggest that "single" expressions of interest may be unreliable and lack permanence. That is, a child's statement that he is interested in being a fireman may be true when he is a certain age, but not necessarily true at a later time in his life. Children's interests are influenced by many factors, and their expressed interests may not represent their true desires and needs.

Let us take the example of a child from a middle-class community who is asked the question "Would you be interested in going to college?" He may state "Yes, of course" because he feels that it is the thing to do, although he really has little interest in a college education. This child, then, has answered yes because the word *college* is a symbol of respect and status in his environment. Perhaps parental pressures and the desire for the prestige associated with the college graduate may have influenced his answer.

Fowler, in an article dealing with the value of expressed interests of students, states:¹

There are two chief arguments, both supported by ample studies, against dependence upon self-estimated interests in choosing an occupation. One of these arguments concerns the factors which interfere with making a realistic choice, factors leading students to declare

¹ Fred M. Fowler, "Interest Measurement Questions and Answers," *School Life* (December 1945), p. 1.

occupational goals too hard to reach. . . . The second major argument . . . calls attention to the frequent disagreement between self-estimated and measured interests.

In support of the above points one can add the experience of vocational counselors who deal with adults. It is not uncommon for the vocational counselor to see persons who are in occupations in which they claim to have interest but who are actually occupationally misfitted. In my own private practice I have seen many cases of this. For example, during a counseling session with a teenage boy, concerning future vocational plans, the boy stated: "I want to be in something I like—not like my father." During future counseling sessions the fact of the father's unhappiness in his job as an electrical engineer was repeated over and over. At the conclusion of the counseling sessions with the boy a conference with the father was arranged.

Mr. Snow, the boy's father, was a well-groomed man in his middle forties. He presented the appearance of a moderately successful man. He began the interview by asking about the progress of his son and stating: "I don't want my son to be unhappy in the profession he chooses. That's why I asked you to see him and give him tests and guidance. I've seen too many men in jobs they weren't suited for." I asked him if he was happy in his work, and he replied that he was. I noticed an uneasiness in his reply and waited for him to continue. There was a long pause and then sheepishly he looked at me and said he wasn't really sure if his answer was a true one. I suggested that he take an interest inventory, to which he rather reluctantly agreed.

On this particular test Mr. Snow scored high in the areas of social service and sales. His scientific and mechanical interests were considerably lower. When the results of the tests were discussed with him, he related the manner in which he had decided upon becoming an engineer.

His father, who had been an engineer, died at the time Mr. Snow was in the second grade, and his mother had never remarried. Mr. Snow's mother had always held up to her son the fact that his father was a good man, and would have liked his son to become an engineer. Therefore Mr. Snow never thought of any career but engineering. Because he did well in science and mathematics, it was assumed that engineering was a good vocational choice for him.

After the test results were presented to Mr. Snow, he admitted that he was unhappy in his work and missed the opportunity of working

with people. After a series of counseling interviews, Mr. Snow talked to his employer and asked if he could be given a chance in engineering sales. His employer granted his request, and today Mr. Snow is much happier in his vocational situation. A year after our interviews I received a call from him and he said: "I am a new man in this work. For the first time in my life, I can be happy when Monday comes and not dread going to work."

Of course, not all people who rely on self-estimates in selecting their occupations are unhappy with their choices; some are very happy. Self-estimates are, however, often poor indicators for future occupational placement. This is the reason the counselor attempts to look at more than what the child says he wants to be or do in life.

As we have mentioned, a person's stated interests may not always be in line with his true feelings. It is for this reason that professionals in this field construct their instruments to ask a variety of questions concerning the person's likes and dislikes. That is, questions such as whether he would rather read a book or go to the movies are asked rather than ones about professional choices—whether he would rather be a lawyer or a teacher.

One of the most widely used interest inventories is the *Kuder Preference Record*. In schools it is usually given at the ninth or tenth grade. This inventory consists of 168 questions. Each question is made up of three choices of activity, to which the person taking the test must respond by choosing the one he likes most and the one he likes least. Figure 3 illustrates the actual set of instructions and sample problems from the *Kuder*.

The *Kuder Preference Record-Vocational* was first published in 1939. Since that time a great deal of research has gone into its refinement. The *Kuder* yields scores in the following areas of activity: outdoor, mechanical, computational, scientific, persuasive, artistic, literary, musical, social service, and clerical.

Your child's counselor can use the results of the *Kuder* in several ways. First of all, his counselor can point out occupations for further study. These occupations would be in fields of preference that your child had expressed on the *Kuder*. Secondly, the *Kuder* is valuable as a check on whether the student's choice of occupation is related to the type of thing he ordinarily prefers to do. If your child's choice of occupation is not made up of activities he likes, his occupational choice may be a poor one.

KUDER PREFERENCE RECORD

VOCATIONAL

FORM CH

Prepared by G. Frederic Kuder, Editor, Educational and Psychological Measurement
Professor of Psychology, Duke University

This blank is used for obtaining a record of your preferences. It is not a test. There are no right or wrong answers. An answer is right if it is true of you.

A number of activities are listed in groups of three. Read over the three activities in each group. Decide which of the three activities you like most. There are two circles on the same line as this activity. Punch a hole with the pin through the left-hand circle following this activity. Then decide which activity you like least and punch a hole through the right-hand circle of the two circles following this activity.

In the examples below, the person answering has indicated for the first group of three activities, that he would usually like to visit a museum most, and browse in a library least. In the second group of three activities he has indicated he would ordinarily like to collect autographs most and collect butterflies least.

EXAMPLES

Put your answers to these questions in column O.

P. Visit an art gallery

Q. Browse in a library

R. Visit a museum

S. Collect autographs

T. Collect coins

U. Collect butterflies

Most→

Most→

O
• P •
• Q • ←Least
• R •
• S •
• T •
• U • ←Least

Some of the activities involve preparation and training. In such cases, please suppose that you could first have the necessary training. Do not choose an activity merely because it is new or unusual. Choose what you would like to do if you were equally familiar with all of the activities.

In some cases you may like all three activities in a group. In other cases you may find all three activities unpleasant. Please show what your first and last choices would be, however, if you had to choose.

Some activities may seem trivial or foolish. Please indicate your choices, anyway, for all of the groups. Otherwise we cannot give you a complete report. Your answers will be kept strictly confidential.

Please do not spend a lot of time on one group. Put down your first reaction and go on. Do not discuss the activities with anyone. An answer is worthless unless it is your own judgment.

Figure 3 (Reprinted by permission of Science Research Associates, Inc., from *Kuder Preference Record*, Vocational Form CH. Copyright 1948 by G. Frederic Kuder.)

Listed below is one area of interest and some of the occupations that make use of this interest at professional and nonprofessional levels. Of course, there are similar lists for each of the areas of interest measured on this inventory. These listings may be found in the *Kuder Manual*.²

Scientific:

- Professional
 - Chemist
 - County Agricultural Agent
 - Dentist
 - Chemical Engineer
 - Electrical Engineer
 - Pharmacist
 - All Physicians and Surgeons
 - Psychiatrist
 - Veterinarian
 - Meteorologist
 - Forest Supervisor
 - Natural Scientist
 - Psychologist
 - Social Scientist
 - Curator
 - Dietitian
 - Traffic Engineer
 - Optometrist
 - Chiropractor
 - Osteopathic Physician
- Semiprofessional:
 - Aviator
 - Laboratory Technician and Assistant
 - Ballistics Expert
 - Weather Observer

Clerical and Kindred:

- Physician's or Dentist's Assistant and Attendant

Protective Service:

- Detective
- Policeman
- Skilled and Semiskilled:
 - Optician
 - Lens Grinder or Polisher

² Reprinted by permission of Science Research Associates, Inc., from *Kuder Preference Record*, Administrator's Manual, Vocational Form C. Copyright 1960 by G. Frederic Kuder.

In addition to the *Kuder*, many schools use the *Strong Vocational Interest Blank* in the senior year of high school. The *Strong* is made up of 400 items. The person responds to each of the items by marking one of three options called Like, Indifferent, and Dislike. There are over 40 different scoring keys for the men's form. Most of them are for occupations at the professional level, such as chemist or lawyer. These keys were developed by comparing a group of men who were successfully engaged in a certain occupation with a group of men in general. Thus men in law may, for example, answer differently and uniquely as compared to other men of different vocations.

In addition to the men's form there is a form for women that is similar in format. It is not, however, as good an instrument as the men's form. It is more difficult to get a clear-cut picture of women's interests because of their dual role in society—that is, wife and/or professional person.

The interest pattern your child reveals on the *Strong* is compared to patterns of men successful in given occupations. For example, Johnny's interest pattern may show he has the same interests as chemists and science teachers. In addition, his interests may also be similar to those of physicians, dentists, and engineers.

The choice of whether to use the *Kuder Preference Record* or *Strong Vocational Interest Blank* inventories is dependent on the age, grade, and future plans of your child. As has been stated, the *Kuder* is generally not given until the ninth grade, whereas the *Strong* is basically used in the senior year of high school with students who are planning to go to college. This is because the *Kuder* is made up of general interest areas, whereas the *Strong* focuses on specific occupations at the professional level. Both of these instruments are used not only with high school students but in adult vocational counseling.

There are other inventories of interest, but none of them have received the attention and years of research that the *Strong* and *Kuder* have.

WHAT DO THE RESULTS OF INTEREST INVENTORIES MEAN TO YOUR CHILD?

Many studies concerning the relationship between interest and ability have been made. Most of them show a slight relationship between academic achievement in a field and interest in it. There is also some indication that those of high ability in a certain field will

show some interest in it. However, this relationship is too low for us to state that an interest inventory can be used to determine ability or on the other hand that an ability or achievement test can reveal interest. The counselor must have both types of information for sound vocational counseling. It is important, therefore, that parents remember that if their child has a high score in scientific interest, it does not necessarily mean that he has the ability to become a scientist. *In making a vocational choice, the interest pattern of a child must be viewed along with his past academic record, achievement, and aptitude test scores.*

Let us examine an actual counseling situation to see how interest inventories are used. Ralph Laine, counselor at Education High School, is thinking about one of his students. The boy, whom we will call Jerry, is attempting to decide on a career. His highest interest scores are in mechanical and artistic areas. Mr. Laine, after reviewing the results of the interest inventory, looks up Jerry's ability and achievement test scores as well as his class record. He does this because he knows that ability as well as interest are required for success in a vocation. From the class record and test data Mr. Laine can see that there is a good chance of college for Jerry. He therefore points out to Jerry occupations that utilize his interest and abilities. He discusses with Jerry, for example, the possibility of becoming an architect, an artist, or teacher of art. In addition, he points out occupations at the semiprofessional level that do not require a college education, such as draftsman, decorator, and taxidermist. He does not, however, go into other fields that do not require even a high school education, such as upholstery or tailoring. Though the job is still far from a simple one, the interest test has narrowed the field, and Mr. Laine and Jerry can now concentrate on the occupations requiring mechanical and artistic activity.

In viewing the interest pattern of your child there are certain facts in addition to those already mentioned that the interested parent must bear in mind. First, interest patterns generally reveal themselves in able and mature children at the age of 15 or 16. However, some develop definite interests as late as age 22, and others may never develop these patterns. Second, interest patterns generally seem to be established in a person before he has had a chance to have extensive occupational experience. Third, because a child has certain interests, we cannot say definitely that he will be successful in the areas of his interest. Other factors, such as ability, must also be considered.

Fourth, we can state that interest scores may predict the happiness or feeling of satisfaction a child may receive from certain types of work. Fifth, most people may be satisfied in many different types of school-work and in a number of different jobs. Sixth, if a person wants to fake his interests, he can do this easily. The *Kuder* has keys that sometimes reveal faking, but it is not foolproof. Of course, most children and adults seeking vocational guidance are prone to be honest in their answers. And seventh, motivation and personality enter the picture and must also be taken into consideration.

In concluding our discussion on interest inventories, it may be well to repeat a very important fact that every parent should remember. That is, *parents should not confuse measures of interest and ability. Remember that the fact that a child scores high on an interest scale is no guarantee that he or she has the aptitude required to succeed in that field.*

PERSONALITY TESTS

The word *personality* has different meanings to different people. To some it is another word for *popularity*; either the person has it or lacks it. To others it is a "song to be sung." To many psychologists personality is the total sum of the characteristics and behavior of a person. This includes everything from intelligence to social relations. To other psychologists personality is the distinguishing characteristics of a person. Obviously, *personality* is a broad and general term that lay and professional people define differently. It is impossible to define it in exact terms, for the definition is dependent upon the concepts of the individual explaining its meaning.

Educators generally view personality in terms of adjustment. They are concerned with the functioning of the child in the classroom. Is the child well adjusted enough to learn, or does he have problems that interfere with the learning process? Because educators need to know the answer to this and other questions of adjustment that may affect your child's academic progress, tests of personality are administered in our schools.

As in the case of interest inventories, personality "tests" are not really tests but self-reports. That is, there are no right or wrong answers. The pupil is asked to answer questions concerning his own feelings, emotions, and needs. These questions may be specific: "Do you often feel unhappy?" "Can you make friends easily?" "Do you

suffer from headaches?" Or the student may be asked to make up a story about a picture or tell what he sees in an ink blot.

Though some of these tests are not always exact or scientifically accurate, they do give us some clues as to the whys of behavior. Thus, in spite of their limitations, they generally give the school a better means of insight than subjective daily contacts. Teachers not trained in the study of human behavior will often label a child as "bashful," "lazy," or "quick-tempered." Though these judgments may be good enough as descriptive labels, they are only signs of possible emotional difficulties and do not explain the reasons *why* the child is "lazy" or "bashful."

In our discussion attention will be focused on two types of instruments used in the schools to understand a child's emotional makeup. They are called personality inventories and projective techniques.

PERSONALITY INVENTORIES

Personality inventories are similar to interest inventories in that they are paper-and-pencil self-reports. Most have statements about actions and feelings to which the person responds by indicating if these are or are not like him. Some inventories have a Can't Answer category so that the individual does not always have to answer yes or no to the statement. There are a large number of these inventories. We will discuss a few of them.

One of the best-known and oldest personality inventories is the *Bernreuter Personality Inventory*. On this inventory the child or adult is asked to answer yes or no or with a question mark to 125 questions.

Another type of inventory used widely in the schools is the *Mooney Problem Check List*. The *Mooney* differs from other inventories and personal report forms in that it makes no provision for actual student scores. That is, there are no scores that indicate problems; instead the teacher or counselor looks over the form to locate areas of problems that pupils have checked. Its major uses are in counseling and research.

One of the most accurate personality inventories in existence today is the *Minnesota Multiphasic Personality Inventory (MMPI)*. More research has been done on it than any other inventory now available. The *MMPI* was designed to provide an objective measure of some of the most important personality characteristics that relate to personal and social adjustment. It can be used with adolescents and adults.

There are 550 questions that the person taking the inventory answers either yes or no or leaves blank, depending on his feelings.

The *Minnesota Multiphasic Personality Inventory* has items that act as checks on factors of lying, inability to read the test items, psychological defensiveness, and willingness to answer the questions.

The *MMPI* can be given by people not trained in psychology; however, it is dangerous for persons not skilled in its use to interpret the results. Usually the *MMPI* is given only by the school psychologist and usually only after parental permission has been obtained. This is not the kind of test that is given to all children, only to those who have revealed emotional problems. We will have more to say about this later in the chapter. Suffice it to say for now that the *MMPI* should be given by a trained person and not to all children, only to those with symptoms of emotional problems.

In order to clarify the role of the *MMPI* in the school, let us take the case of Bill. Bill was referred to the writer by the school social worker because of his inability to get along in the classroom. Bill's test record showed he was in the superior range of school ability. However, his grades were either F (failure) or D (barely passing). Bill would spend much of his time drawing pictures and just plain "goofing off," as the teachers called it. The social worker was unable to come up with a clear diagnosis, so after receiving parental permission, Bill was given the *MMPI*. The test results showed Bill was the type of boy who was unable to cope with his environment. It was obvious that Bill was a fairly sick boy and needed immediate treatment. Thus the social worker, on the basis of the *MMPI* and other data, referred Bill to an agency that could help him.

Parents should remember that the *MMPI* is used in the school only in individual cases when the child is unable to function in the classroom and then many times in conjunction with such other personality instruments as projective tests.

Listed below are items like those that appear in the standard personality inventories:

Please Underline Those Items That Apply to You:

1. I am failing in school.
2. Unhappy with my courses.
3. No room to study at home.
4. My mother and father do not understand schoolwork.
5. School does not offer courses I want.
6. I don't have a choice in courses at school.

7. Courses don't help me in life.
8. I am too fat.
9. I am too short.
10. I seem to get colds too often.
11. I seem to be tired all the time.
12. I am in love.
13. I am not sure if I am in love.
14. I need help about getting married.
15. My head often feels as if there were a rubber band around it.
16. I feel tired much of the time.
17. Noises bother me.
18. When I am embarrassed I sweat all over.
19. I get angry easily and then forget it.
20. I often feel I have something in my throat.
21. I don't care what others think of me.
22. My parents find fault with me more than they should.
23. I like music.
24. I would like to be a doctor.
25. People talk about me.
26. Someone has been trying to kill me.
27. Sometimes some silly thought will be with me for days.
28. I get anxious when I have to travel.
29. I smell strange odors.
30. I hear voices when no one is near me.
31. When things are dull I try to make some excitement.
32. Sometimes I can't sit in one place very long.

What Part Do Personality Inventories Play in Your Child's School Life?

You as a parent are, of course, interested in knowing the value of personality inventories in your child's education. Let us again, therefore, state: *Personality tests are not given to all youngsters. They are administered only to children who have displayed behavior patterns that could possibly indicate emotional problems.*

One of the basic problems in administering personality inventories is the amount of reading required. A child who is slow in reading may tire of the test and respond without careful consideration of the test item. In addition to the amount of reading, difficulty with words is another problem. If the vocabulary and abstractness of the ideas are beyond the child's comprehension, he may respond to the test item in a careless manner. Some tests like the *MMPI* have scales to detect this problem, but most others do not. Thus parents should be aware of the fact that personality inventories are of limited value with children (or adults) who have trouble in reading.

Another difficulty is the reluctance of some children and adults to be honest in their answers. For most personality inventories the person must be honest in his response in order to get a valid picture. Studies have shown that most personality inventories can be faked. That is, the person with some psychological insight can give whatever picture of himself he desires. However, on the *MMPI* this is not as likely to happen, because there are scales that indicate whether or not a person is responding truthfully.

The above problem means that your child's scores on a personality inventory is subject to error, and the interpretation of these scores must be done with extreme caution. For example, let us suppose that a personality inventory is given to a ninth-grade boy who has been giving his teachers a difficult time. To this boy, teachers may be a symbol of authority against which he rebels. Therefore, if the test is given by a teacher or other authority figure, there is a good chance that he will not be honest in his answers. Secondly, one must remember that children are taught to do their best on tests in school. This being the case, many children are not going to reveal their personal problems. Besides, some children who reveal a healthy adjustment on an inventory may in actuality be defensive and unable to reveal their real problems.

Parents should remember that personality inventories are middle class in thinking. Items often have different meanings for different socioeconomic levels.

"O.K. If personality inventories have so many shortcomings, why are they given at all?" This is certainly a legitimate question. Personality inventories are given because they provide a quick insight into some children's problems. Secondly, school personnel usually do not have the extensive training required to administer the more complex psychological tests, such as projective devices.

PROJECTIVE TESTS

We have just reviewed some of the standardized objective personality tests in which we find out about a person by having him tell us about himself. There is another approach in personality testing, and it is called projective techniques. In this type of test we are able to learn about the individual by exploring his world of make-believe. This is done by providing material that is indefinite and having the person respond to the material in his own unique manner.

Projective techniques have their rationale in common everyday observations. For example, did you ever notice how one person will view an accident, play, or painting in a different manner than you have? The manner in which a person may perceive things depends upon his background, and this, of course, varies with each individual. The more vague the material presented to a person, the more opportunity he has to project himself into it. Projective tests take advantage of this situation. An ink blot, a picture, or a word may suffice as a means of finding out about the person's feelings and thoughts.

Projective tests are given only by trained personnel, usually school psychologists, after other informational devices have failed to provide enough information. Projective techniques, like personality inventories, are not used with all students, but only with children who present serious emotional and/or intellectual problems. In a book of this type we cannot explore all the various projective techniques available. Therefore we will confine our discussion to two of the most widely used tests. These are the *Rorschach Test* and the *Thematic Apperception Test (TAT)*. The *Rorschach Test* is one of the basic diagnostic tools of most psychologists. It was named for its originator, a Swiss psychiatrist. This test is sometimes referred to as "the ink blot" test. It consists of 10 cards, each having a different ink blot; five are printed in black and five in color.

The psychologist shows one card at a time to a child (or adult), asking him to tell what the ink blot makes him think of and what it may mean to him. After the initial instructions, the psychologist does not directly help or instruct the child, except to show him the cards. After the 10 cards have been given they are presented a second time. In this phase the psychologist attempts to find out what in the ink blot made the child answer as he did. For example, the psychologist may state, "What in card one made you think of a bat?" In this manner the psychologist gains insight as to where in the ink blot the child saw the "bat" as well as what in the child's background made him think of a bat.

Throughout the *Rorschach* examination, the psychologist records in detail the child's responses. After the test is completed, an analysis of the record is made. The scoring and interpretation of the *Rorschach* record is a long and complicated task, and the psychologist needs a great deal of training and experience to do it competently. Thus the administration and scoring of a *Rorschach* should not be undertaken

by a teacher, counselor, or even some psychologists who have not undergone special training.

The *Rorschach* reveals information about the whole personality. It attempts to answer such questions as these: Does the person deal with the main aspects of a problem, or does he become immersed in details? What is the child's intellectual potential, and does he utilize this ability? Are his ambitions greater than his capabilities? What are his methods of handling emotional problems?

As the reader can see, the *Rorschach* is a time-consuming and complex instrument to use. Therefore it is given only by trained clinical psychologists and only to children who are in need of it. Many school districts are not able to afford the services of a psychologist, and often they must refer this type of testing to a psychologist in an outside agency or one who is in private practice.

Another projective test in wide use is the *Thematic Apperception Test (TAT)*. It was developed by two psychologists, H. A. Murray and C. D. Morgan, of the Harvard Psychological Clinic, in 1935. The *TAT* consists of a set of pictures showing human figures in different poses and actions. Some of the pictures are only for boys, others for girls, some for adults (over 14 years of age), and others are for all individuals. There are 20 pictures for a particular age and sex. However, in most cases the psychologist limits himself to only those pictures he considers appropriate for the person.

The psychologist instructs the child (or adult) to tell him a story based on the picture presented. Before any of the pictures are shown to the child, the psychologist states that he would like a past, present, and future to each of the stories. The exact instructions sometimes vary, but they always include the above. The psychologist may say as follows: "I am going to show you some pictures. I'd like you to tell me a story about what is going on in each picture, what has led up to it, what is happening now, and what may happen in the future." The stories are recorded verbatim by the psychologist. There are no time limits, and the child may give a short or long story, depending on how he feels.

The scoring of the *TAT* is not quite as time-consuming as the *Rorschach*. Many different scoring methods have been tried with the *TAT*. All of them have in common the analysis of the content of the stories. Whatever method is used in interpretation, the examiner attempts to get a whole picture by an analysis of all the cards administered rather than drawing conclusions from only one card. The *TAT*,

like the *Rorschach Test* and personality inventories, is not given to all children but only to those who have shown behavior patterns that might indicate emotional disturbance.

Projective tests do not have the same shortcomings as personality inventories. This is because the tasks presented are not as easily seen through. The child cannot depend upon stereotyped answers to give a false picture of his emotional adjustment. Also the child is not aware of the exact reason for the test, and even if he is, he cannot know what type of answer is meaningful. Another advantage of projective tests is that few require reading ability. Tests such as the *Rorschach* can be used with children even below school age. There is no cultural or language limitation. In addition, they provide a picture of the whole child, not just one aspect. In essence, then, the scope of projective techniques is much wider than that of personality inventories.

Let us look at an actual case that was recently referred to this writer. The reader will note that the boy is given more than one type of test.

A 16-year-old boy was referred by the social worker because of episodes of disturbed behavior. His behavior in the school ranged from extreme activity and elation to extreme depression. He would sit on the desk of the teacher and start to lecture to the students or sulk in his seat. At one time he would tell his teachers how he was going to make a million dollars once he graduated from school, and at other times he would tell them how worthless he was.

This boy was the only child of a successful businessman who seemed to be intelligent and quite prosperous. The boy's interests were narrow. He had few and only brief associations with girls. He did not smoke or drink and was quite religious.

After a consultation with the parents and social worker, it was decided that psychological tests were needed. A whole battery, including the *Rorschach*, *TAT*, and *Wechsler Adult Intelligence Scale*, was given.

The results showed that the boy was of superior intelligence, but his emotional conflicts and feelings of inadequacy seriously interfered with the full use of these abilities. Psychotherapy was recommended. The psychiatrist was given a full report of the test results and was able to initiate treatment with a fairly good picture of the boy.

Of course, many schools will not have the services of a full-time psychologist and may have to refer a child to an outside agency. The

important thing for a parent to keep in mind is that a child is never given personality tests, especially projective tests, unless there is an apparent problem. In addition, one test is never considered as the basis for a definitive statement about a child's emotional problems. The psychologist uses a battery of tests and formulates his opinions based on the total picture from all test data and the child's history, as well as through information gained through interviews with the child.

WHAT DO COLLEGE ENTRANCE EXAMINATIONS MEAN FOR YOUR SON OR DAUGHTER?

6

Today the American college is faced with the problem of accommodating the large numbers of young people desiring entrance. The baby boom of the war years is now hitting the colleges. Many "war babies" are now of college age, and colleges are faced with aspiring youngsters and not enough room to accept all who desire admission. Thus some means of screening applicants must be used. One method is the use of a standardized testing program. Before we discuss the types of tests that are administered, it may be wise to state that in the United States, public schools are for "all the people," whereas colleges have always been for people with special academic abilities. Thus even before the "war babies" colleges were using standardized testing. In fact, soon after testing was developed, colleges began to use them for purposes of selection.

A great deal of admissions testing for colleges is done by several private testing concerns. One of the oldest and best known of these is the College Entrance Examination Board (CEEB). In 1900 the Board began to administer entrance tests for a few of the Ivy League colleges. The first tests consisted of essay questions. A college applicant was called upon to answer the questions in his own words and handwriting. In 1926 an objective test called the *Scholastic Aptitude Test (SAT)* was used for the first time. Today the *SAT* is in wide use throughout the world.

The College Entrance Examination Board has its tests given at testing centers all over the world. The centers administer the tests and send them back to the headquarters of the Board for scoring. The results are then sent to the colleges to which the person has applied for admission as well as to the person himself. These tests are taken by your youngster in his senior year of high school. However, he or she may also take the *Preliminary Scholastic Aptitude Test (PSAT)* in his or her junior year. This test is administered to youngsters who are planning to go to college, and the results can help the guidance

staff in helping your child to choose a college or in helping a college to choose your child. The results may also make it possible for some children to obtain early admission to college.

Let us examine the College Entrance Examination Board program in detail. The program of tests consists of the *Preliminary Scholastic Aptitude Test*, the *Scholastic Aptitude Test*, and the *Achievement Tests*.

The *Preliminary Scholastic Aptitude Test* is given to students in their junior year of high school. The College Board investigated students' academic performance in college based on three years of high school, and they found that by the time a child is a junior in high school his performance in college can be predicted by an aptitude test, and his three years of grades almost as well as by his senior-year grades and test scores. Because of this finding, the College Board decided to offer the *PSAT* to encourage earlier and a higher level of college guidance. Thus the College Board recommends the *PSAT* for juniors. Colleges that are College Board members will consider the *PSAT* scores in early counseling and in giving advice to prospective students concerning their chance of acceptance and success.

The *PSAT* is a two-hour examination. There are two scores, verbal and mathematical. The scores are reported on a scale ranging from 20 to 80 points.

As a parent you may be wondering if the *PSAT* is really necessary. You may be saying to yourself: "Look here, by the time my child is in his junior year the school already has information useful for counseling him about college plans. I have also read that a child's performance in college preparatory courses is the most important indicator of college success or failure. And besides all of the above, what about those standardized tests you have been talking about? My child's school has an active testing program. Isn't that enough testing? Why is the *PSAT* needed or helpful anyway?"

The *PSAT* may be helpful in several ways. For instance, the child who gets all A's at one high school may be only a C student at another school. The *PSAT* helps solve the problem of different standards among high schools by serving as a national yardstick that can be used to measure your youngster's ability as compared to other boys and girls throughout the nation. In addition, your child's counselor will have information concerning the required scores needed for admission on this test by various colleges and universities. He therefore

can help your child in early planning for college in a realistic and meaningful manner.

It is not wise, however, to assume that a child's *PSAT* score is the only factor in predicting college success or failure. Let us say, for example, that your youngster scores below 30 on the *PSAT* and is thinking of going to college. His academic record is good, and he seems to be motivated to work in school. In addition to these factors you can offer him strong financial and spiritual support. If this is the case he can probably still gain admission to college if you and your child with the counselor or teacher's support and guidance select a college carefully.

After your youngster has taken the *PSAT*, he will be given his scores and a booklet entitled "Your College Board Scores: *Preliminary Scholastic Aptitude Test*." This booklet contains information on the meaning and interpretation of these scores. For example, your child may compare his scores to all juniors and seniors in the country by using the tables provided. These tables relate the *PSAT* scores of junior and senior boys and girls to national standards. Thus these tables will show how your child compares to other junior or senior boys or girls.

Let us look at the case of Donald, a junior with a *PSAT* verbal score of 50 and a mathematical score of 55. Donald's national percentile ranks would be 93 in verbal and 91 in mathematics as compared to all junior boys. This would mean that on the verbal section Donald scores better than 93 per cent of all boys, academic and non-academic. On the mathematics section his score of 91 would be higher than the mathematics scores of 91 per cent of all junior boys.

In explaining the test results to Donald's parents certain cautions were suggested. Donald's parents were told that students with very high percentile ranks on the national norms would not necessarily enjoy a favorable position when compared to students at certain selective colleges. This is because each college has its own standards and cutoff¹ points. Other comparisons and percentiles besides national norms are provided to give the student a more realistic gauge. For example, percentile ranks of secondary-school juniors who actually took the *PSAT* are also provided. This is in contrast to the national norms, which are based on the assumption that all recorded school

¹ *Cutoff* means the minimum score a college will consider in reviewing an application.

juniors have taken the *PSAT*. If we look at Donald's scores in comparison to those students who actually took the *PSAT*, we get a different picture. On these norms Donald ranks at the 78th percentile in the verbal area and the 77th percentile in the mathematics section.

According to the College Board the second comparison is not as important as the first. The Board states: "How a student's scores compare with those who happen to have taken the *PSAT* . . . has less relevance than his standing nationally or his standing at the college to which he will apply."

The oldest examination of the College Entrance Examination Board is the *Scholastic Aptitude Test (SAT)*. This test measures basic skills that your child uses in his schoolwork. Like the *PSAT* it has two sections, verbal and mathematics. *It is a test of ability, not one of factual knowledge.* In the verbal section there is emphasis on the ability to read with understanding and to reason with words. The reading material consists of passages from such academic fields as the humanities, social science, and science. The mathematical section measures the youngster's aptitude in solving problems and stresses mathematical reasoning rather than factual recall of his high school mathematics work.

Of course, verbal and mathematical talents are related to college success. Usually the scores of a youngster on the *SAT* are closely related to his success as a student. One usually finds, therefore, that a student who has a good academic record will score high on the *SAT*, whereas the student who has performed poorly in school is very likely to receive a low score. Thus the child who scores high on this test usually does well in college, whereas those who receive low scores generally do poorly. Of course, there are exceptions to the above generalization. There are exceptions to every rule, and the *SAT* is far from being a perfect predictive yardstick.

As a parent, you must remember that one test is only a single indicator of probable success or failure. We can say, however, that in the general student population high scores are indicators of probable college success.

Scores on the *SAT* are reported in numbers ranging from 200 to 800. About two thirds of the students taking the *SAT* score somewhere between 400 and 600. In terms of a general grading system, in which zero is at the bottom and 100 is a perfect score, we can state that 200 is equal to zero, and 800 would be equal to 100. Therefore a child cannot receive a score below 200 or one above 800.

Your child takes the *SAT* for the same reasons that he takes the *PSAT*—the *SAT*, however, is more important—because it is the final test and it is a requirement for admission to many colleges. The score obtained by a youngster is reported to the college or universities of his choice. It helps these schools in evaluating applicants from all over the world by providing them with a standard frame of reference to judge a variety of college applicants.

As an interested parent, you may be asking yourself this question: "How can my youngster prepare for the *SAT*?" The best advice one could give would be to have your child start in the first grade of school. Though this may sound like I am evading the question, it is a most honest and logical answer. This is because school skills are the direct result of practice and instruction over a long period of time. You can't expect Johnny to study for a few weeks or even months and acquire the skills that he should have learned years before. No one believes that one can learn to play the trumpet or sing or become a major league baseball player overnight. All of these skills require years of growth and practice. By the same token, one cannot learn to read well or reason logically in a few hard sessions of cramming.

Research into the problem of preparation for the *SAT* has shown that cramming or special course preparation does not raise the student's score enough to make it worth while. Thus the best preparation for your youngster is to do his schoolwork in earnest, read widely, and observe and think about his environment around him throughout his school years. The administrators of the College Board Examinations state that the student should avoid cramming and come to the test situation well rested. Each student who plans to take the *SAT* is given a booklet describing the test. In this booklet, the suggestion is made that the student go over the practice questions carefully so that he will understand the directions clearly and not get bogged down in confusion over the directions when he comes to the actual testing situation.

The *SAT* is administered in January, February, March, and December of each year, and students are notified in advance to register for the test by their secondary schools.

As mentioned previously, the *Scholastic Aptitude Test*² has two

² The following six sample questions are reprinted with permission from the 1960 edition of *A Description of the College Board Scholastic Aptitude Test*, published by the College Entrance Examination Board. This booklet, which contains many illustrative examples of the different kinds of questions

sections, verbal and mathematical. These sections are divided into six halfhour segments. As the test progresses, the questions become more difficult. Listed below are some sample questions from the SAT.

Verbal Section

Antonyms (Opposites)

DIRECTIONS: Each question below consists of a word printed in capital letters, followed by five words or phrases lettered A through E. Choose the lettered word or phrase which is most nearly *opposite* in meaning to the word in capital letters. Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

EXAGGERATION: (A) slight misunderstanding (B) silence
(C) accurate representation (D) truth (E) understatement.

SCHISM: (A) majority (B) union (C) uniformity (D) conference (E) construction.

CHRONIC: (A) slight (B) temporary (C) wholesome (D) patient (E) pleasant.

Mathematical Section

DIRECTIONS: In this section solve each problem, using any blank space in the booklet for figuring. Then select the *one* correct answer.

What do 28 feet of wire weigh, if 154 feet weigh 11 pounds?

(A) 2 (B) $\frac{28}{11}$ (C) $\frac{11}{2}$ (D) 7 (E) 14

A line segment OP is drawn from the point (0,0) to the point (6,4). What are the coordinates of the mid-point?

(A) (2,3) (B) (3,2) (C) (3,4) (D) (6,2) (E) (12,8)

The town of Mason lies on Eagle Lake. The town of Canton is west of Mason. Sinclair is east of Canton but west of Mason. Dexter is east of Richmond but west of Sinclair and Canton. Which town is farthest west?

(A) Mason (B) Dexter (C) Canton (D) Sinclair
(E) Richmond.

Another feature of the College Entrance Examination Board is the *Achievement Tests*. Many colleges require the *Achievement Tests* in addition to the *Scholastic Aptitude Test*. Some colleges specify which achievement tests the student must take, whereas others allow the student a choice.

that are used in the Scholastic Aptitude Test, is revised annually and is supplied without cost to high schools for distribution to students before they take the test. The booklet may also be obtained on request by writing to either of the College Entrance Examination Board addresses: Box 592, Princeton, New Jersey 08540; or Box 1025, Berkeley, California 94701.

Each achievement test is one hour in length. There are achievement tests in the fields of biology, chemistry, English composition, mathematics-intermediate, mathematics-advanced, physics, social studies, French, German, Hebrew, Latin, Russian, and Spanish. Hebrew and Russian are given only in March, whereas the others are given four times a year.

The College Board also offers what it calls *Supplementary Achievement Tests*, which are given early in March of each year. These tests are in the area of foreign languages and are usually longer than the other achievement tests. They test a student's listening comprehension as well as his ability to read and write the language.

The scores on the achievement tests are reported on the same scale as is the *Scholastic Aptitude Test*—that is, ranging from 200 to 800. They are reported to the student and also to the colleges or universities he designates. Do not be alarmed if your child does not receive his score until late in his senior year. The *Achievement Test* results are not usually received until the student's college application has been submitted.

In interpreting achievement test scores you and your child should remember that what is considered a good score at one college may not be considered good at another. Colleges vary in the score they require for admission and placement.

In order for you and your child to better understand what these scores mean, there are several factors to consider. First of all, because all students do not take all the achievement tests, a child may be competing with more able students on one test than on another. For example, the average score on the *Advanced Mathematics Test* is generally around 600, whereas the average *Social Studies* score is about 500. Your child's counselor will have information concerning scores on the various achievement tests and can help you to interpret his scores.

Secondly, you should consider your child's foreign language score in relation to the number of years he has studied the language. It has been found that students taking these tests differ significantly in their scores according to the number of years of foreign language study. According to the College Board, students with three years of a language score 80 points higher than those with two years of study; those with four years of study generally score 60 points higher than those with three years of study.

A newer college admissions testing program that is separate from the College Entrance Examination Board is the American College Testing Program. The tests for this program include general skills in English, social studies, mathematics, and science. The tests are given at centers all over the United States.

The English test measures your son's or daughter's ability to express his or her ideas in writing.

The mathematics test measures the student's understanding of mathematical principles and his ability to apply them in the solution of arithmetical problems.

The social studies test measures the child's ability to read, evaluate, and draw conclusions from written material in this field as well as his general information and understanding of basic social concepts.

The natural science test measures the student's ability to handle reading material in this area as well as his understanding of scientific terms and principles.

In addition to the scores on the four tests mentioned above, your child will receive another score. This score is called the *composite score* and is an average of the four tests and indicates the student's general ability to succeed in college.

Copies of the *American College Test (ACT)* scores are sent to your child's high school and to three colleges of his choice. These scores are reported in terms of percentiles. (See Chapter 7 for an explanation of percentiles.)

It is important in comparing your child's score to know with what type of students he is being compared. To assist the student in understanding his score, he is given a booklet that contains percentile ranks for four different groups of students. These groups are National Twelfth-Grade Students; National College-Bound Students; Freshmen in College "Y"; and Freshmen in College "Z." The reader should note that colleges "Y" and "Z" do not actually exist, but are only examples of two different types of colleges.

To illustrate how these percentile rankings may help the student to understand his scores, let us take the case of Bob Bennett. Bob received a score of 24 on the English test. His percentile rank as compared to National Twelfth-Grade Students was at the 91st percentile; compared to College-Bound Students, it was at the 79th percentile; compared to Freshmen at College "Y," it was at the 46th percentile; compared to Freshmen at College "Z," it was at the 90th percentile.

The above example shows that it is extremely important to remember with whom your child is being compared. In the Twelfth-Grade group there are pupils from large and small schools, some of whom are not planning to go to college, whereas others are outstanding students planning to enroll in college. Thus these students represent a wide range of abilities. The College-Bound group is a more selective group. These are students who actually took the *American College Test* and are planning to go to college. Note that Bob's percentile rank in this group is 79 as compared to his 91st percentile in the National group. Now let us look at Bob's standing compared to freshmen at two different colleges. Note that Bob's rank at College "Y" is only at the 46th percentile, whereas his rank at College "Z" is at the 90th percentile. This means that Bob would probably be more suited for work at college "Z," where he would be among the better students than at College "Y," where he would be slightly below average.

One of the reasons for the American College Testing Program is to help guide your child's college choice. One way of doing this is to compare his score to freshmen already enrolled in colleges. Some colleges will accept only students of superior scholastic talent, and others prefer the average boy or girl. This can be seen in the two colleges "Y" and "Z." In the same way that we compared Bob Bennett's scores to freshmen at College "Y" and college "Z," your child, with the help of his counselor, may compare his score to the freshmen at the actual college of his choice. If the counselor is unable to supply this information your child may ask the college representative who visits his school, or he may write a letter to the admissions officer at the college he is considering.

IS YOUR CHILD A GENIUS OR A DULLARD BECAUSE OF HIS SCORES ON COLLEGE ENTRANCE EXAMINATIONS?

This is a difficult question to answer because of the many factors involved. First let us take a look at the meaning and implications of scores derived from the examinations and then return to the question.

Let me first state, rather dogmatically, that college admissions tests are *not* perfect indicators of how a student will perform in college. Actually, there is no one device available today to predict with 100 per cent accuracy a student's success or failure in college. These tests do, however, give a fairly good indication of the student's chance of success or failure.

The formula used by most colleges in determining your child's admission is the high school record (academic and extracurricular), teacher and counselor recommendations, high school standardized test scores, and of course, college entrance examinations. Utilizing all the above, the college makes its choice.

Let us take the case of Jane and Bill to illustrate the place of college admissions tests in screening applicants.

Jane is an attractive senior girl at Glen High School. Her high school record shows that she is a good student. Her academic average is B+. She has been a cheer leader for three years and is presently the editor of the school newspaper. Her teachers like her and will give her excellent recommendations. On the *Scholastic Aptitude Test* she obtained a score of 400 on the verbal section and 350 on the mathematics section. Her achievement scores in English composition, French, and social studies are all somewhere in the 400's. Jane would like to attend an Eastern girls' school, and her parents have money set aside for this.

The standards of the better girls' schools in the East are fairly high, and generally, test scores such as Jane's would not be acceptable to these schools.

The Eastern school may feel that Jane has overextended herself in high school and could not live up to their standards. Thus, even though her record is excellent, she may not gain admission to this type of school. Factors such as the type of high school Jane attended would be very important. If Jane's high school is one of excellent academic reputation, she may still gain admission. The important thing to remember is that Jane could be admitted to other colleges in the country. And even with her low college entrance examination scores she may still gain admission to a highly selective school because of her other outstanding credits. Thus Jane is not "doomed" because of her college entrance examination scores.

Now let us look at a different situation. Bill is a senior at North High School. He is a rebellious boy who is not very interested in school and cares little about homework. Consequently, his grades in school have been rather poor. His grade average is C. He has done little in the way of extracurricular activities and is generally disliked by his teachers. On the College Board examinations he received the following scores: verbal—650; mathematics—700; English composition—600; French—650; chemistry—700.

These scores indicate that Bill has the ability to succeed in college.

Even with these excellent scores, however, he may find some college doors closed to him because of his poor academic record. However, he will probably gain admission to some college because of his promising potential.

The reader can see from the two examples cited that test scores are not the only criteria that the college uses for admission. Certainly most children do not present such extreme cases. However, there are variations, and for this reason the child's whole record is taken into account. In Jane's case, it is possible that she has developed good study skills and has devoted a lot of time to her homework. The chances are that these habits will carry over in her college work and help her earn higher grades than her College Board scores would indicate—that is, if she has made good grades on quizzes and final examinations in high school and has not received her high grades because of her appearance, and ability to get along with her teachers.

In the case of Bill we may state that in predicting success or failure in college there are certain negative signs even though his test scores are very high. Why? Because Bill has operated below his potential for so long, the chances are that he will continue to do so in college. Study habits have to be developed, and Bill has apparently not done this. In addition, he does not seem motivated to do so. He may state that this will all change in college, but the chances are that he will continue this pattern.

Of course, there are many exceptions to what has been stated. We are speaking in general and in terms of probability, not certainty. There are students like Bill who not only change their school pattern but go on to be scholars and prominent people in the arts and sciences. In general, however, this does not happen. Still, because of the chance that it may, Bill should be encouraged to go on to college, and counseling, to ascertain the reasons for his underachievement, should be planned.

The important thing that parents and their children should remember is that College Entrance Examination Board scores and the American College Testing Program are to help them and are not simply an obstacle course to be hurdled. If a youngster enrolls in a college that is beyond his abilities, he may flunk out or quit in discouragement. On the other hand, if he is guided into a college that is commensurate with his needs and abilities, he is more likely to complete his education. In the long run, then, the test scores are helpers, not hinderers, in the child's choice of college.

Putting aside the question of college admissions, let me return to our first question: "Is your child a genius or a dullard because of his scores on entrance examinations?"

Because college entrance examinations are based on group comparison it is difficult to equate their meanings to innate intellectual ability. Some general guidelines, however, can be drawn. For example, if your child receives College Board scores on the *SAT* of 225 and 250, it is safe to assume that he is not going to win any prizes for scholarship. We cannot state his exact IQ, but a good guess would be that such a youngster is not above average in intelligence. On the other hand, a youngster with *SAT* scores in the 700's would be a good candidate for scholarship awards, and we could state with some certainty that he is of superior intelligence. Outside of these two extremes it is difficult to equate IQ and college entrance examination scores. Thus we can state that you should not think of your child's scores on these examinations and his basic IQ as being equivalent. The two are different though they have some common elements.

In summary, then, you should remember that the college entrance examinations are not devices to keep your son or daughter from receiving a college education but tools in helping the colleges choose students who meet their specific standards and a tool to help your child in selecting a college that is most likely to meet his needs. They are not specifically tests of a child's intelligence, and one cannot equate IQ and college entrance examination scores.

HOW CAN YOU INTERPRET YOUR CHILD'S TEST SCORES?

7

Today, in a boom period of standardized testing, there has been much pro and con on the use of tests and their accuracy. Some people say, "Our children are being tested to death," and they feel that tests are not worth the money spent on them. On the other side of the fence are those who would make tests the last word, almost to the point of divine revelation. Of course, neither extreme is correct. Somewhere between these two poles lies the real truth. Let us look into the actual facts and then decide for ourselves.

THE ACCURACY OF TESTS

A good question to start with is this: Are tests infallible? The answer is relatively easy: *no!* However, many teachers and parents sometimes think they are. One of the most common errors made by people whose knowledge of testing is limited is the assumption that a test is 100 per cent reliable. If Mrs. Jones's boy has a reported IQ score of 110, she thinks her child is definitely brighter than Mrs. Smith's child, whose IQ score is 109, and definitely inferior to Mrs. Thomas' child, whose IQ score is 111. Parents sometimes fail to realize that a test score is only an estimate of the child's general level of performance or ability and that a test score varies from test to test and from one day to the next.

Professional measurement experts are aware of this fact because their research studies have shown that a child's test score may vary considerably from one test to another and even on the same test taken at different times. They know that traits such as intelligence cannot be measured with the same degree of accuracy as one can measure temperature, height, or weight. This is why it is generally considered unwise to use only one test as a basis for estimating a child's intelligence, educational progress, or aptitude.

Test results are often misunderstood by parents and teachers in that the assumption is made that a test score or scores can predict

future performance with 100 per cent accuracy. The reader will, for example, recall that we referred in an earlier chapter to tests used to predict a person's performance in a vocational or academic pursuit. It is common knowledge that a chemist must have a good background in mathematics. If Johnny scores at the 50th percentile on a mathematics ability test, can we infer that he will fail in science courses in college? No, we cannot conclude from this score that Johnny will not succeed in science. We can state, however, that in every 100 students with mathematics scores that are the same as Johnny's, only a small number will succeed in a college science curriculum. The test scores, therefore, only provide the odds of success or failure. It is an instrument that helps Johnny, his counselor, and his parents know his chances, not a crystal ball that will predict the correct answer 10 out of 10 times. After all, in horse racing the experts are sometimes wrong and long-shots do win. Most of the time, however, the favorites finish "in the money."

Parents should remember that although test scores provide information that is useful in vocational and academic planning, the final decision must be made by the child himself. As I have stated previously, such other data as school records, motivation, and Johnny's maturity must also be taken into account. If we allow test scores to be the only determiner, we are misusing them. On the other hand, to ignore test results in favor of other data is also a misuse of one aspect of the total picture.

It would be a simple matter to guide children vocationally and academically if tests were infallible and the only factor to consider. We could gather the data from tests of intelligence, aptitude, interest, and personality, feed it to a computer, and have our problems answered for us: John is to be a chemical engineer; Phil is to be a truck driver; Jerry is to be a nuclear scientist; Mary is to be a dress designer; Jane is to be a housewife. Of course, the problem of planning a life is not so simple, and in working with human beings, two and two does not always equal four.

My philosophy in testing is the same as the legal philosophy that has made America great: every man is innocent until proven guilty. We would rather let 10 guilty men escape justice than sentence one innocent man. Because of this philosophy America has gone over backward in its zealously to protect the innocent. Let us do no less in protecting the vocational futures of our children.

In order to illustrate this, let us look at several cases. Certainly, these cases are the exceptions, not the general rule, but after all, we are dealing with people, not impersonal numbers.

Jerry M. was born in Germany during the early 1930's. His father was a professor of history in a well-known German university. One day Jerry's father took him for a walk down the main street. In front of Jerry, who was five years old, were three rather muscular men in brown shirts with swastika arm bands. Jerry, being no different from most young boys, was awed by their uniforms. He ran up to one of the soldiers and greeted him with a salute. The soldier kicked Jerry and sent him sprawling to the gutter. Jerry's father was then beaten into unconsciousness. Jerry and his father were Jews.

Not long after this incident, Jerry and his family migrated to the United States, where his father was employed as a professor in a well-known university. Jerry was enrolled in the first grade. After a few months Jerry's teacher found that he was making little progress in reading and learning English. The father was sent for and recommendations were made for individual intelligence testing. Jerry's teacher felt that he was a retarded child. The psychologist's report was in agreement with the teacher. Jerry had a reported IQ of 65. There was no doubt that Jerry should be in a special education class for educably mentally handicapped children. (The astute reader may question the reliability of the tests in that Jerry was still new to the English language. This was no problem, because the psychologist giving the test was also a German immigrant and was able to administer the test in German.)

The father was quite upset about the findings, as most parents would be, and would not accept them. He chose to send Jerry for psychiatric help. The psychiatrist's report showed that Jerry was emotionally disturbed and needed intensive psychotherapy. After five years of psychotherapy, Jerry's IQ score had risen from 65 to 90. Although this was remarkable, Jerry was still far from being a scholar. At the end of the ninth grade Jerry was only a year behind his class in most of his subjects, and his IQ score had risen to 110.

The last the writer heard of him, Jerry was studying for his Ph.D. in chemistry. Certainly, this is an extreme case and by no means the usual run of affairs. Also, let me point out that psychotherapy is not a cure for mental retardation. Jerry was never mentally retarded;

however, the trauma of his life in Germany and other factors prevented him from using all of his intellectual capacity.

Let us look into the case of Bill. At the end of eighth grade, Bill's score on a standardized intelligence test was below average. What does this score mean? It means that Bill's score, compared with that of other 13-year-olds, was below average on one particular test. One aspect of Bill's ability had been tested. What do we actually know about Bill?

If we look further we learn a great deal more. First of all, intelligence testing in previous years had shown that Bill was an above-average child. If we look at the teacher's cumulative records, we see better-than-average grades and a boy who had been cooperative in class. His past academic history and test scores, therefore, do not reveal a child of below-average ability, although his school grades in the eighth grade are not as good as they were in previous years.

If we delve further into Bill's background we find that his father has been unemployed for the last year. His 45-year-old father had been a top-flight executive in industry. The father's unemployment had caused financial problems and bickering between his parents. The below-average score on the intelligence test now begins to mean something different than it would have if we had gone no further than the test score itself. By considering Bill's history—that is, school performance, past test scores, the home situation, and other information—his teachers can now interpret this single test score in a more meaningful manner.

Let us look at another, quite different case, the case of Stewart. Stewart, a nine-year-old, was kept in the third grade because of poor work. His group intelligence and reading test scores were very low. After Stewart had repeated the third grade, his teacher suggested a slow-learner's class for him. Stewart was described by his teacher as "timid and unable to express himself fluently."

The school principal, realizing that the teacher's description of Stewart, along with the school record and test scores, were possible signs of severe intellectual or emotional problems, decided that a thorough study of Stewart was needed. Therefore Stewart was referred to the school psychologist for intensive testing.

The psychologist administered a complete series of psychological tests, including individual tests of intelligence and personality tests. The tests indicated that Stewart was a mentally retarded child with an IQ of 68. There did not seem to be any signs of emotional problems

or brain damage. A conference with Stewart's parents was held, and recommendations for transfer to a special education class were made. In this case all of the available information pointed to one conclusion: Stewart was a mentally retarded youngster. His so-called timidity and his inability to express himself clearly were not due to home or emotional problems but were signs of lowered intellectual ability. It is important for parents to note that a diagnosis concerning Stewart's abilities was not made on the basis of a single test. The diagnosis was arrived at only after a thorough investigation of his school record and his scores on different kinds of tests.

Let us look at the case of Sidney, who, from outward appearances, seems to be similar to Stewart. Sidney, an 11-year-old, was retained in the fifth grade because of his poor schoolwork. His group intelligence test score showed low ability, and his achievement tests showed little progress. Sidney was described by his teacher as "shy and unable to get across his ideas or thoughts to me or his classmates."

Sidney was referred by his teacher to the school psychologist. The teacher was convinced that he was a mentally retarded boy. The psychologist found Sidney to be of superior intelligence, with an individual IQ test score of 130. There seemed to be some emotional disturbance centering around his relationship to his parents as well as extreme feelings of inferiority.

Sidney's mother and father were immigrants and spoke little English in the home. Three older children in their early twenties had graduated from high school and were married. Sidney, the last child at home, had been pampered and his every whim indulged. On the other hand, he was taught to respect his elders and remain silent in their company. Sidney was given little freedom to express himself, and when he did, he was told that "he didn't know nothing and to keep quiet."

The reader can see that from outward appearances Stewart and Sidney seemed very much alike. They both had poor school records, exhibited similar personalities, and had poor test scores. If only a single test of group intelligence had been used, both boys would have been placed in the same class. Their symptoms were the same, but the causes were completely different. Only through the intensive studies that were made did the individual differences in intelligence, personality, and home life reveal themselves. Stewart and Sidney's problems could only be seen when all aspects of the total picture were evaluated.

TECHNICAL ASPECTS OF TESTS

We have already seen some of the human factors involved in testing. In order to understand the accuracy of a test score, we must look into some of the mechanical aspects of the test itself. People who test realize, in constructing their tests, that the results may sometimes be in error. Thus they establish for each test the margin of error one might expect. This is called the standard error of measurement. For example, if a child obtains an IQ score of 110, is this score representative of his true ability, or could he, upon taking the same test again, obtain a higher or lower score? If the test user knows that the margin of error for that particular test is 10 IQ points, he can feel fairly confident that the child's true IQ score would be within the range of 110, plus or minus 10 points, or will lie somewhere between 100 and 120.

The reader who is interested in pursuing this area more thoroughly can refer to the books listed in the bibliography. For now, let us look at the practical application of this error in measurement.

Mary Smith, a high school senior, has recently taken a college admissions test. The college she is considering has more applicants for admission than openings. This college has found in its use of this particular test a score of 82 or better to be indicative of student success at their school. Mary's score on the entrance examination is 78. Mary's academic record is good, but her test score is four points below the college's standard requirement.

The admissions director, considering Mary's school record, asks himself the question "If Mary took this test over would she obtain a score of 78 again, or some other score?" The admissions director consults his test manual and finds that the standard error of measurement is 3 points. The chances are that Mary's true score would be somewhere between 75 and 81. Because a score of 82 is needed before an applicant can be considered, the director may decide that Mary does not warrant admission. Because there are many more applicants for the freshman class than space available, the admissions director must reduce the number of eligible candidates and possibly exclude some worthy students.

Parents may find the above approach "heartless." Yet in essence it really is not. Actually, Mary is not being judged by her score of 78 and therefore excluded from consideration. She has been given the

benefit of a range of error on the test. That is, her score is considered to be somewhere between 75 and 81. In addition, such other factors as her school record have also been considered. Realistically, the admissions director must make a choice because of the limited room available. All other things being considered, he must give the applicants with as good or better records and higher test scores the opportunity for admission first.

The problem that centers around the accuracy of tests is not always inherent in the test themselves. In actuality, it is the misuse of them that causes confusion. The claim made by some persons that tests always identify pupils who will profit by certain types of education is not true. The tests are not perfect, and any system based on this assumption alone will be open to question. It is a human tendency to want a black-and-white answer to problems that beset us.

Classifying pupils by numerical scores is, in a way, a pattern of our culture. It is not uncommon to hear one teacher asking another "What is Jane's IQ?" The answer, regardless of its accuracy, is often an expression of the opinion or feeling of the teacher toward the child. I am sorry to say that this practice still continues even though professional measurement experts have attempted to show the fallacy of judging a child on one test score.

Parents should remember that it is impossible to explain human traits and potentialities on the basis of a test score or scores alone. We cannot squeeze into numerical terms a child's individuality.

THE MEANING OF TESTS IN PLANNING YOUR CHILD'S FUTURE

We have already seen the error of using tests alone to determine the child's future. We have discussed the reliability of tests and the error that is inherent in them. With this background let us look at the positive and useful manner in which tests can be used to help your child. Let the reader, however, be aware of the fact that we are discussing only one aspect of the whole picture.

Let us start with the child who is entering the first grade and from there will proceed on up the educational ladder.

In some communities where kindergarten attendance is fairly regular, tests at the end of kindergarten are looked to as one way of forming first-grade classes for the following year. If you live in a community without a kindergarten system, the child's first experience with tests will probably be sometime in the first months of the first

grade. In either case, a reading readiness test and general intelligence test will most likely be given.

After you have been informed of your child's test score you may have certain questions. For example, if your child's scores on the reading readiness test shows that he is not ready to read, what can you do?

First of all, *you must not* show any feelings of disapproval, for the results do not mean he is necessarily slow or retarded. They do mean that in terms of development he is not ready to start his reading career. Give him time; he will eventually develop to the point of readiness. In the meantime, do not push him or expect too much progress in his reading. Of course, the teacher will watch his development for signs of readiness.

If, after the first year of school, he has shown little growth and his intelligence test results are low, you should inquire about individual testing. If a parent has a retarded child it is best to spot this as soon as possible and arrange for appropriate placement in a special education class. It is important from the beginning of a child's school career that he not encounter failure at every turn of the road. If he meets failure too early and too often because he is not ready to learn, he is apt to be psychologically damaged. He may get the idea or self-image that he *cannot* do certain things, when in reality this may not be true.

If your child's test scores show he is ready to read, you will know that he is ready to begin his academic career. Here again it is best not to push him but to let him go at his own pace. His teacher is qualified to teach him to read, and parents generally are not. If after the first year he has made little progress in reading and his intelligence test score shows he is of average ability or above, then you will, of course, want to investigate the reasons for his difficulty.

Later in your child's elementary-school career, he will be given a more accurate group intelligence test, probably in third or fourth grade, along with achievement and reading tests. The results of these tests should enable you to know in what direction your child is going and how much guidance and "push" your child may need. Let us look at two different children and how the parents of each reacted.

Mildred was a well-behaved girl with above-average ability. Her reading readiness test at the first-grade level showed she was ready to begin learning to read. In the fourth grade, her intelligence test score was in the above-average range. Her achievement tests, how-

ever, showed she was two grades behind her class. In terms of educational progress, she was still at the second-grade level. Mildred's mother had a conference with the teacher and was shocked to hear that Mildred might be retained in the fourth grade. When Mildred came home that afternoon, "all hell broke loose," and Mildred was scolded quite severely. Mildred continued to do poorly in school and failed the fourth grade.

Cindy was a girl of average ability whose reading readiness test in the first grade showed she was ready to begin reading. In the fourth grade her intelligence test score was average. Her achievement tests showed that Cindy was two grades behind her class. Cindy's mother had a conference with the teacher and was disappointed in hearing of her child's progress and the possibility that Cindy might not pass the fourth grade. When Cindy came home that afternoon, she was greeted with a loving embrace, and milk and cookies were ready for her as usual. After eating, Cindy's mother asked her why she was doing poorly in school. Cindy seemed embarrassed and could not give her mother any specific reason for her failure. Cindy's mother, sensing her child's uneasiness, dropped the subject by saying, "Don't worry, Cindy, I am sure we can work out this problem." Cindy's facial expression showed some surprise, and her mother followed up her support by stating, "Cindy, I want you to do well in school and so I will not be happy if you fail, but I want you to know that no matter what happens, I will still love you." Cindy's mother, after much thought, decided that her daughter's problem might be partially due to her. She canceled her bridge games and gave Cindy more attention and began to help her with her schoolwork. Cindy passed the fourth grade.

The two cases cited are examples of the way in which test results and school grades were handled by different parents. Mildred's mother reacted emotionally and did not try to find the reasons for her daughter's problem. On the other hand, Cindy's mother attempted to understand the underlying causes for her child's difficulty, and positive use was made of the test information.

If test results are not put to positive use, there is little point in giving them. To scold your child because he does poorly on a test does not help him or you.

When a child is ready to enter secondary school he is usually given a series of tests. These tests, which include scholastic aptitude, achievement, and ability tests in certain specific areas, are designed to help

place him in a high school curriculum that will be most meaningful to him. Sometimes parents misunderstand the significance of these tests and reprimand their children for not doing better on them. As we have already stated, this attitude is *wrong*. Children cannot study for these tests as they might for a classroom examination.

The writer discussed this problem with a colleague not long ago, who related an interesting incident. His secretary, an intelligent woman in her middle years, was talking about how well she understood the meaning of standardized tests, whereupon my friend asked her what she would do if her child scored poorly on one of them. "I would see to it that he studied harder," she answered. Let it be stated once again, that children cannot study for these tests, and the results should be used to *help*, not hinder, their educational progress.

If your child's test scores at the end of eight grades indicate certain weaknesses and the school suggests courses other than those you have in mind, give the school a chance to present its case. There is no point in enrolling a child in algebra, for example, if his algebra aptitude scores and his performance in arithmetic are quite low. The school, in making its suggestion, will consider, of course, other factors, which include many different types of test scores, school record, and teacher recommendations. If the school recommends a general mathematics course, or that your child should delay his study of a foreign language, you would be wise to heed this advice. There is nothing so damaging to a child's future schooling as continual failure. The parent who goes against the evidence is asking for trouble.

During a youngster's career in high school, he will be given many tests. These tests, along with other information, will give him and his parents some indication of his chances of success or failure in certain vocational and educational pursuits. Again, let me state that no single test or series of tests are 100 per cent accurate; however, when test data along with other sources of information are used, the chances of error are greatly diminished.

SHOULD PARENTS BE INFORMED OF THEIR CHILD'S TEST SCORES?

The reader who has reached this point in this book may wonder at the legitimacy of questioning whether parents be informed of their child's test scores. After all, this book is devoted to the parental understanding and use of tests in guiding children. How can the parent use the test results in guiding their children without knowing the scores? Are tests in the category of secrets, to be seen only by

professional eyes? Or is it proper for the scores to become common knowledge in the school and community?

These are difficult questions. There are no simple answers. It is impossible to state rules for every kind of test or for every kind of parent. To Mr. Brown, a well-adjusted and well-educated father, the results of his son's examinations may help him understand his boy's capacities. To Mr. Jones, who is insecure and knows little about tests, the same information may provide an explosion that could damage the child and the school. It is difficult for the counselor or teacher to know how different parents will react to their children's test scores. There are certain things, however, that parents should know and have a right to know: *parents have a right to know about the abilities, achievements, and problems of their children. Schools have the obligation to give parents understandable and useful information.*

I am sure that few educators or psychologists will argue against the parental right to know about their children. It is therefore indisputable that parents have the right to know. The question, however, is to know *what*?

Let us look at Sarah's test record. The school has found, as a result of testing, that Sarah's scores in social studies and English usage are a little above average but that in mathematics they are quite low. In general science, she scored about average. Her scholastic aptitude score is quite low in comparison to students in her high school who successfully complete a precollege program. The school can predict, with some accuracy, that three years from now her probable scores on a college entrance examination will be in the range that will make her eligible for a junior college but not a university. An experienced teacher looking over Sarah's test results and school record might guess that good study habits and neatness have helped Sarah obtain grades a little better than one would expect from her test scores.

The above information are things that Sarah's parents should know. This is the type of information that you, the parent, have the right to know. The school has an obligation to see to it that this information is at your disposal. On the other hand, if what has been stated were conveyed to you in terms of numbers, such as Sarah's IQ score, percentiles, and grade-placement figures on achievement tests, you might be confused and misunderstand your child's test results.

The basic point, then, is that what you as a parent need to know is usable and understandable information. There are many methods of expressing test results, and we will discuss these in detail later in this

chapter. For now, let us briefly talk about them in terms of our present topic—what you as a parent need to know.

IQ's as numbers are regarded by psychologists as information that should almost never be reported to students or parents. Numerical IQ is seen by many people, even some teachers, as a true and fixed measure of a person's innate intelligence. Many times, this causes a student or parent to think of himself or his youngster as being at a certain definite level of intelligence. Actually, it should be used as *one* piece of information in a guide for future planning. It has been found that few things interfere more with a real understanding of a child's potential than reporting exact IQ scores to parents. It is much more meaningful to you as a parent to know that your child is below average, above average, or superior than to know an exact number.

Grade placement scores are not as likely to cause as much trouble as IQ scores. Yet they may give the parent an illusion of understanding. It is because grade placement scores seem so simple that serious misunderstandings often result from their use. A grade placement score indicates the grade in which your child would be average. If a child's grade placement score indicates a grade different from the one he is in, it does not mean that he should be in that grade. It means only that he has equaled the score of the *average* child in that grade.

Percentiles are among the safest and most easily understood numbers if the parent is informed (1) that they do not refer to the percentage of questions answered correctly but to the percentage of people whose performance your child has equaled or surpassed and, (2) who the children are with whom your youngster is being compared.

Stanines are probably the most accurate and best method of expressing test scores. We will have more to say on their use later. Let us simply state now that the stanine is a single digit number. Stanines range from a low of 1 to a high of 9, with an average of 5. For example, a student with a stanine of 7, 8, or 9 in a subject is well above the typical student in his grade, and a student with a stanine of 2 or 3 is well below. In the use of stanines, as well as percentiles, you should be aware of what the norm group is—that is, to whom your child is being compared.

The reader may wonder whether any numbers are necessary. I am not going to suggest a ban on the use of numbers in reporting test results to parents. However, I have noted the fact that the best coun-

selors and teachers often report test results without numbers. They communicate to parents understandable information rather than statistical jargon, and parents seem to be happier with this type of approach.

A counselor or teacher may tell you: "Your youngster's test scores are like those of students who find the problem of gaining admission to a liberal arts college and getting a degree rather difficult. If they finish college it is only after great effort and work. Students with similar test scores find a year or two in a technical school interesting and usually do well in the jobs to which this training leads." Or he may give you exact information, such as: "Your daughter scored 450 and 300 respectively on the Verbal and Mathematical sections of the College Boards. Her IQ is 100, and her reading grade placement is 10.5. On the *Differential Aptitude Tests* her scores are the following: verbal reasoning—4; abstract reasoning—4; numerical ability—6; space relations—7; clerical speed and accuracy—8; language usage—sentences—3, spelling—4; and mechanical reasoning—8. On the *Sequential Tests of Educational Progress* her scores are the following: social studies—40th percentile; science—55th percentile; and mathematics—65th percentile."

The reader can see that in the first explanation information gleaned from the youngster's test record is put into easily understood and useful terms, whereas the second approach merely reports test scores, and the parent is left with a maze of numbers to decipher.

What you as a parent need to know are two kinds of information:

1. The test results of your youngster in meaningful terms, such as: "Your son's intelligence is in the superior range of ability."
2. Something about the test or series given and how much reliance you can put on the scores your youngster obtains on it. That is, in terms of odds, how much stock you should place in the reported results.

Some parents feel a need to know exact scores; if you are such a parent, be sure to have your child's counselor or teacher explain the exact meanings of the score numbers and the group to which your child is being compared. In order to help those parents who will receive, for one reason or another, exact numerical scores of their

child's IQ, the table below is offered as a reference. Note the column headed "Percentage of All Persons." This is the percentage of children who score at the various levels, such as 120-129, and so on. The reader should note that although these descriptions are for a specific test, they are useful as general guidelines in the interpretation of IQ scores.

DISTRIBUTION OF THE 1937 STANDARDIZATION GROUP*

IQ		Per cent	Classification
160-169	0.03	{	Very superior
150-159	0.2		
140-149	1.1		
130-139	3.1	{	Superior
120-129	8.2		
110-119	18.1		
100-109	23.5	{	Normal or average
90-99	23.0		
80-89	14.5		
70-79	5.6	{	Borderline defective
60-69	2.0		
50-59	0.4		
40-49	0.2	{	Mentally defective
30-39	0.03		

* Lewis M. Terman and Maud A. Merrill, *Stanford-Binet Intelligence Scale: Manual for the Third Revision, Form L-M* (Boston: Houghton Mifflin Company, 1960), p. 18. Reprinted by permission.

Let us take the case of Bill to explain the meaning of an IQ score. Bill's IQ as measured by the *Stanford-Binet* was 100. Bill's IQ must not be thought of as meaning "exactly 100" but rather probably between 95 and 105; very probably between 90 and 110. It can be seen, therefore, that according to IQ classification (see table above) Bill could be anywhere from the low side of average to above average in intelligence. The reader can probably understand now why psychologists are so reluctant in giving exact IQ scores to parents. It is a great

youngster's test performance, we will discuss in more detail the interpretation of various kinds of scores.

IQ Interpretation

In Chapter 2 we discussed the early beginnings of the concept of IQ and what IQ's mean and what they don't mean. Let us now turn our attention to the interpretation of IQ scores and how you may compare an IQ score from one test to another.

It is dangerous and erroneous for a parent to think that his child's IQ is higher than another's unless the parent knows the exact test and the limits of the test. For example, a child may answer correctly all the questions on one IQ test and receive a score of 140, and on another test, he may miss many items and receive the same or a higher score. Clearly, one cannot make a comparison from one IQ test to another without knowing the highest score obtainable on a given test. In the table below are equivalent IQ's of widely used group intelligence tests.

If you as a parent were to find out your youngster's IQ, the numerical designation could be misleading. For example, what does an IQ of 110 mean? In order to help those parents who do know their

EQUIVALENT IQ'S ON FIVE WIDELY USED GROUP INTELLIGENCE TESTS*

<i>California</i>	<i>Quick-</i>	<i>Beta</i>	<i>Form F</i>	<i>Form S</i>	<i>Booklet G</i>	<i>Form A</i>	<i>Form A</i>
140	145	140	142	140	142	142	151
130	134	130	132	130	132	132	139
120	123	120	121	121	121	121	126
110	113	110	111	111	111	111	113
100	102	100	101	101	101	100	100
90	92	90	92	92	92	90	87
80	81	80	81	82	79	79	74
70	70	70	73	73	69	69	61

*Max D. Engelhart, *Equivalents of Intelligence Quotients of Five Group Intelligence Tests*, Bureau of Pupil Personnel Services, Chicago Public Schools, (mimeographed report, 10 pp., no date). Reprinted by permission.

deal more meaningful, as well as more accurate, to tell Bill's parents that he is of average intelligence, rather than giving them an IQ score of 100. A single IQ score can be a potentially dangerous piece of information unless parents understand its limitations.

Grade Placement (or Grade Equivalents)

As I have stated previously, it is a questionable practice to report children's achievement test results in terms of grade placement. The problem of misleading the parent is great. If the child's achievement test scores are reported in terms of grade placement, the parent should bear in mind the following considerations:

1. The grade placement norms are obtained by testing representative groups in each school grade, and the average score is then determined for each grade.

2. The standard method in terms of numbers is to assign the number one to the first grade, number two to the second grade, and so on up to number twelve, for the senior year in high school. For example, 6.0 would be the average performance at the beginning of the sixth grade, and 6.5 would be average at the middle of the sixth grade.

3. Grade placement scores are limited by the fact that educational progress is dependent upon the content and emphasis of a given school's instruction. Their use in expressing growth makes sense only for those academic fields where instruction is continuous throughout the school program. Because instruction in the basic academic skills generally tapers off during senior high school, grade placement scores after the ninth grade have little meaning.

4. Grade placement scores have little meaning for the superior child. Many superior children in the eighth grade can obtain scores of only 11+. In addition, they can give false impressions in certain cases. For example, James, a bright and educationally advanced child in the second grade, obtains a score of 4.9 on a standardized arithmetic test. This *does not* mean that James has a mastery of arithmetic taught in the fourth grade. His grade placement score was as high as that obtained by the *average* child at the end of the fourth grade, but his higher score was almost certainly made by his superior mastery of second-grade work, rather than his understanding of fourth-grade work. The fact that James had a grade placement score of 4.9 does not mean that he is ready to move ahead into fifth-grade work.

The grade placement score in summary, then, is a device to give

the parent an indication of the work of his child as compared with that of the average child at each grade level, and it is useful in providing a reference point for explaining a child's academic accomplishment in elementary school. For this purpose they are meaningful, even though they must be interpreted with caution.

Percentiles

Percentile ranks, or norms, are widely used in reporting test results to parents. We have just seen that in grade placement scores the meaning of a child's score is determined by comparing his score to the grade group in which he would be average. Often, however, it is more meaningful to compare him to his own age or grade group—that is, to a group of which he can be considered a member. Thus a 10-year-old child in the fifth grade would be compared to other 10-year-olds in the fifth grade. This is the method of comparison used when we speak of percentile ranks or norms.

In the table on page 102 is an example of raw scores and their percentile equivalents on a test of Reading Comprehension and English Usage.

If you look at the column headed "Reading Comprehension," you can see the raw scores. These raw scores are translated into percentiles by looking across at the column headed "Percentile." For example, a raw score of 22 corresponds to the 75th percentile. A boy who achieves this score is better than 75 per cent of the group on which these norms were based. A raw score of 16 corresponds to the 50th percentile on this test. On the "English Usage" test a score of 17 corresponds to the 50th percentile.

Percentiles can be used with adults as well as children. An individual who is better than 90 per cent of a given group on a test shows a degree of excellence, whether the test is measuring academic ability or the time a person can stand on his head. However, there are certain limitations in the use of percentiles that make them less than perfect.

First of all, the group that is being used as a reference point presents some problems. As a parent you should know to what reference or norm group your child is being compared. It is obvious that we need different norm groups for different ages and grades. A 12-year-old child's evaluation *must be* made in comparison with other 12-year-old children; an eighth grader, in terms of eighth-grade norms; and so

THE "X" TEST OF ENGLISH

Percentile	Raw Scores	
	English Usage	Reading Comprehension
99	41 +	35 +
97	36-40	32-34
95	33-35	30-31
90	30-32	27-29
85	27-29	25-26
80	25-26	23-24
75	24	22
70	22-23	21
65	21	19-20
60	19-20	18
55	18	17
50	17	16
45	16	15
40	15	14
35	14	12-13
30	13	11
25	12	10
20	10-11	9
15	9	7-8
10	7-8	5-6
5	6	3-4
3	4-5	1-2
1	0-3	0

forth. The group to which you compare your child in every case *must be* the group to which he or she belongs. It is of no value to compare a college applicant's academic aptitude scores to the scores of the general population. His scores must be compared to that of other college applicants in order to get a meaningful and realistic picture. The reader can see, then, that there must be many sets of norms for a given test.

There are practical limits, however, to the number of norm groups that can be supplied by test publishers. Therefore your school will often provide its own "local norms" to supplement the published percentile norms. This will help the school determine the standing of your child in comparison with students at his own school. This comparison is often more significant than the use of national norms. As an example, let us look at two different high schools.

Jones High School is a secondary school located in a very well-to-do suburban community. The children who attend Jones are from middle and upper-income families who have been exposed to more cultural and educational experiences than children from the average home. On a standardized test of academic ability the average child's percentile score at Jones High School is at the 75th percentile level. In the national population the average child is at the 50th percentile level. Therefore Jones High School must develop its own norms in order to have more meaningful comparisons and to place children in appropriate classes.

Park High School is located in a large metropolitan area, drawing students from diverse backgrounds. The average child at Park School scores at the 52nd percentile on the same test of academic aptitude. For Park the national norms are appropriate and a valid reference point.

A second problem in the use of percentiles is one of a statistical nature. That is, can we think of the difference between 50th and 55th percentiles as equivalent to the difference between 90th and 95th percentiles? The answer is no. Percentile units are unequal. A child who falls at the 50th percentile in social studies and the 55th percentile in English shows a small difference in these two areas, whereas a child with percentiles of 90 and 95 displays a great difference.

In summary, then, a percentile is a method that provides you with a basis to compare your child's test performance to children of his own age, grade, or other reference point. In order for the percentile to have significance, you must know the group to which your child is being compared. If you know this, the percentile can be quite meaningful.

Stanines

The U.S. Air Force was among the first to use stanines. During World War II the Air Force psychology program was looking for a means of translating its test data into a simple form that would permit the interpretation of hundreds of thousands of test scores without a great deal of effort. The stanine system was an outgrowth of this search. The stanine score is the most accurate method of explaining test results and is being increasingly used in our schools today. The chief reasons are:

1. They are more dependable than any of the other methods in that they are broader in scope and precise enough for the purpose of reporting test scores.
2. They are easily understood. The stanine scale ranges from a low point of one to a high point of nine, with five as the average. Put simply, they are a means of grouping scores into single digit numbers which represent certain raw scores.

Another point in favor of stanines is that they tell you automatically your child's standing. You as a parent will know at once that your child with stanines of 7, 8, or 9 is way above the average child in his grade in the subject being measured. Or, if he has a stanine of 2 or 3, he is well below the average. In Figure 4 a ladder of stanines is illustrated, with the percentage of children reaching each rung.

In my position as a psychologist, I have been called upon many times to explain what is meant by stanines and other questions associated with their use. Following are some of the most commonly asked questions and the answers I give parents.

Question: What is the basis for stanines?

Answer: As you know, not everyone is seven feet tall nor four feet tall. Most people are somewhere in the middle or average rather than at either extreme. In the same way most children do not attain perfect test scores, nor do they miss all the items. Stanines are a way of changing raw scores on tests into more equal steps of ability or achievement. They express the degrees of differences between varying performances. Stanines are like equal steps of height. Each stanine represents about the same range of ability.

Question: How are stanines used in the school?

Answer: When the school groups children according to their abilities—homogeneous grouping—children with stanines of 1, 2, and 3 go into a low group; 4, 5, and 6 go into an average group; 7, 8, and 9 go into an advanced or accelerated group. Of course, grouping is flexible. Some children who may qualify for a certain group because of their stanine scores are often placed in another group for other reasons, such as achievement.

Question: Is there any relationship between school marks and stanines?

Answer: Stanines are an objective way of interpreting standardized test scores. They refer only to the test from which they are obtained. School grades, on the other hand, are more general and subjective. They include class participation, projects, themes, behavior, and many other factors. In general, there is usually a relationship between stanine levels of achievement tests and school grades. If there is a

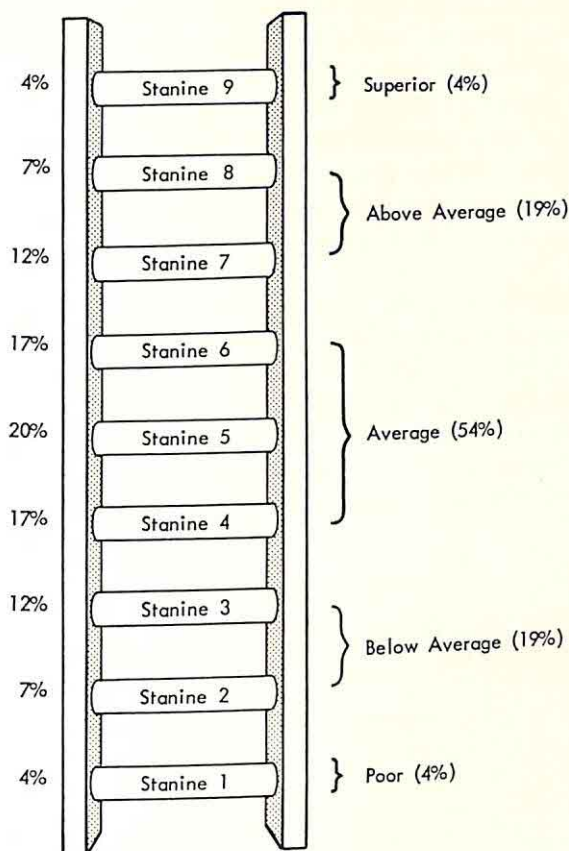


Figure 4

wide gap between your child's stanine, scores on his standardized tests, and school grades, you might question his counselor or teacher to find out why.

Question: Do stanines become dated?

Answer: No, if the population on which they are based remains the same, you can compare them from year to year.

Question: Are stanines used for reporting a child's IQ?

Answer: If by IQ you mean intelligence test results, the answer is yes. Actually, you as a parent can have much more faith in a stanine than a numerical IQ, because stanines are much more stable. Of course, test scores still vary no matter what method we use in reporting them. The variation on stanines is not very great; usually only one stanine up or down occurs. This is not a hard-and-fast rule.

Sometimes, however, a child's mental-ability stanine will go up several points when he goes from a reading test to a nonreading or individual intelligence test.

Parents with gifted children whose mental-ability stanine level is 8 or 9 may find their children's achievement results slightly lower. Parents with children of low mental ability may find their child's achievement results higher than their mental ability scores would indicate. This usually happens in the areas of spelling and arithmetic computation.

The important thing for all parents to remember is that tests are used to help guide your children along the path of education that will be most beneficial to them. Tests are only tools in this direction. They make up one part of a whole picture and must be treated as such. No one single test, no matter how good it may be, can be relied upon to give the compass bearings that your child needs to find his way along the trails and roads of fulfilling his obligation to himself and to society.

GLOSSARY

- ACADEMIC APTITUDE (SCHOLASTIC APTITUDE) A combination of inherited and acquired abilities needed for schoolwork.
- ACHIEVEMENT AGE The average age on an achievement test. If a child obtains an achievement age of 11 years 8 months on a reading test, this means his score was equal to children of 11 years 8 months who on the average receive a similar score.
- ACHIEVEMENT TEST A test that measures the amount of knowledge or skills that a child *has learned* in a particular subject field.
- AGE NORMS Values considered as average on a certain test for children of various ages.
- AGE-GRADE TABLE A table showing the number of students of various ages in each grade.
- APTITUDE The ability to acquire new knowledge and proficiency with training. It is a combination of inborn capacity or ability and/or acquired skills.
- APTITUDE TEST A test that measures the potential ability or capacity of a person to learn various skills and acquire new knowledge.
- ARITHMETIC MEAN The sum of a group of scores divided by the number of scores, which produces an average.
- BATTERY A group of several tests that are comparable, the results of which are used individually, in combination, and/or totally.
- CEILING The top score or upper limit of a test.
- COMPLETION ITEM A test question requiring the student to complete or fill in a word or words in a phrase or sentence from which one or more parts have been deleted.
- DEVIATION I.Q. A comparison of a person's score to a score considered average for his age.
- DIAGNOSTIC TEST A test used to locate specific areas of a child's weakness or strength and that determines the kind of weaknesses.
- EVALUATION PROGRAM Such a program involves the use of testing and nontesting instruments and techniques for the appraisal of growth adjustment and achievement of the child.
- EDUCATIONAL AGE See ACHIEVEMENT AGE.
- FACTOR ANALYSIS A statistical technique for analyzing the relationship among a set of scores.

- FORCED-CHOICE ITEM** Generally, any multiple-choice item in which the child is required to make a choice of answers provided him.
- GRADE EQUIVALENT** A score that indicates a child's average performance in terms of grade and month. A grade equivalent of 7.2 is interpreted as the second month of the seventh grade.
- GRADE NORM** The average score that a child in a certain grade receives on a test.
- GROUP TEST** A test that can be administered to one or more children at the same time by one examiner.
- INDIVIDUAL TEST** A test that can be administered to only one child at a time.
- INTELLIGENCE QUOTIENT (IQ)** The ratio of a child's mental age (M.A.) to his chronological age (C.A.). The formula is $IQ = M.A. / C.A. \times 100$.
- ITEM** A question or exercise in a test.
- MACHINE-SCORED TEST** Generally, a test that can be scored on the International Test Scoring Machine, made by International Business Machines Corporation. The student taking tests scored on this machine records, with a special electrographic pencil, his answers on a separate answer sheet. These pencil marks are electrically conductive, and when placed in the machine, record certain impulses that may be read, on a calibrated dial, as a test score.
- MEAN** See ARITHMETIC MEAN.
- MEDIAN** The point at which a given group of test scores is divided into two equal parts. Half the scores fall below the median and half above it.
- MENTAL AGE (M.A.)** The age for which a score on an intelligence test is average or normal. For example, if a score of 60 on an intelligence test is equal to a mental age of 7 years 9 months, then 60 is the average score that would be made by a random group of children 7 years 9 months of age.
- MODE** The score that occurs most frequently in a distribution of scores. For example, the mode score is 55 in the following scores of children on a reading test: 10, 30, 35, 55, 55, 55, 55, 60, 67, 69, 72, 72, 78, 79, 84, 85, 88, 90, 94, 96, 98, 99.
- NORMAL DISTRIBUTION CURVE** This is a method of representing the distribution of various levels of ability and other characteristics within our society. In a normal distribution, scores are distributed symmetrically about the average, with as many cases at various equal distances above the average as below the average, and with cases concentrated near the average and decreasing in number the further one departs from the average.
- NORMS** A way of describing, by statistical methods, the test performances of specific groups of students of various ages and/or grades. Norms are used to describe average, below-average, and above-average performances. Grade, age, and percentiles are commonly used types of norms.

- PERCENTILE** A score in a group of scores below which falls the percentage of scores indicated by the given percentile. For example, the 25th percentile denotes the score below which 25 per cent of the scores fall. Thus the person obtaining a percentile rank of 25 is considered as equaling or surpassing 25 per cent of the group taking the same test.
- PERFORMANCE TEST** In a way, every test may be considered a performance test. However, pencil-and-paper or oral tests are not usually regarded as performance tests. Generally, a performance test requires the use and manipulation of physical objects and the use of physical and manual skills not restricted to oral and written answers. The important thing is that the test response is identical with the behavior about which information is desired.
- PERSONALITY TEST** A test that attempts to measure everything that constitutes a person's mental, emotional, and psychological makeup.
- POWER TEST** A test that attempts to measure level of performance rather than a child's speed in answering questions. There is little, if any, emphasis on time.
- PRACTICE EFFECT** A term test people use in describing the influence of previous experience with a test. For example, Johnny took the same test two months ago. Will his previous experience with this test help him achieve a higher score?
- PROFILE** A graphic portrait of a child's test results on several tests.
- PROGNOSTIC TEST** A test used to predict future success or failure in a specific academic subject or field.
- PROJECTIVE TEST** A method of testing to determine personality characteristics. The person is presented with a series of ink blots, pictures, unfinished sentences, and so on. The term *projective* is used because it is believed that a person "projects" into his answers and statements his own needs and feelings.
- RANDOM SAMPLE** A sample of the people of a population made in such a way that every person of the population has equal chance of being included. This method attempts to eliminate bias.
- RANGE** The extent of difference between the highest and lowest scores on a test. For example, 98 is the highest score and 10 is the lowest; therefore the range is between 10 and 98.
- RAW SCORE** Usually the number of right answers, or some such formula as rights minus one-half wrongs, which gives a total score.
- READINESS TEST** A test that measures the degree to which a child has achieved certain skills or information needed for undertaking some new learning activity. For example, a reading readiness test indicates the degree to which a child is at a developmental stage where he may profitably begin a formal program of reading instruction.
- RELIABILITY** The extent to which a child would obtain the same score if the test were to be readministered. That is, is the test consistent in measuring whatever it does measure?
- SCHOLASTIC APTITUDE** See **ACADEMIC APTITUDE**.

SPEED TEST A test that measures a child's performance by the number of questions he can answer in a certain amount of time.

STANDARDIZED TEST A test that has definite directions for administering, scoring, and use.

STANINES A nine-point scale. It divides the norm population into nine groups. The mean score from 1 to 9 is 5.

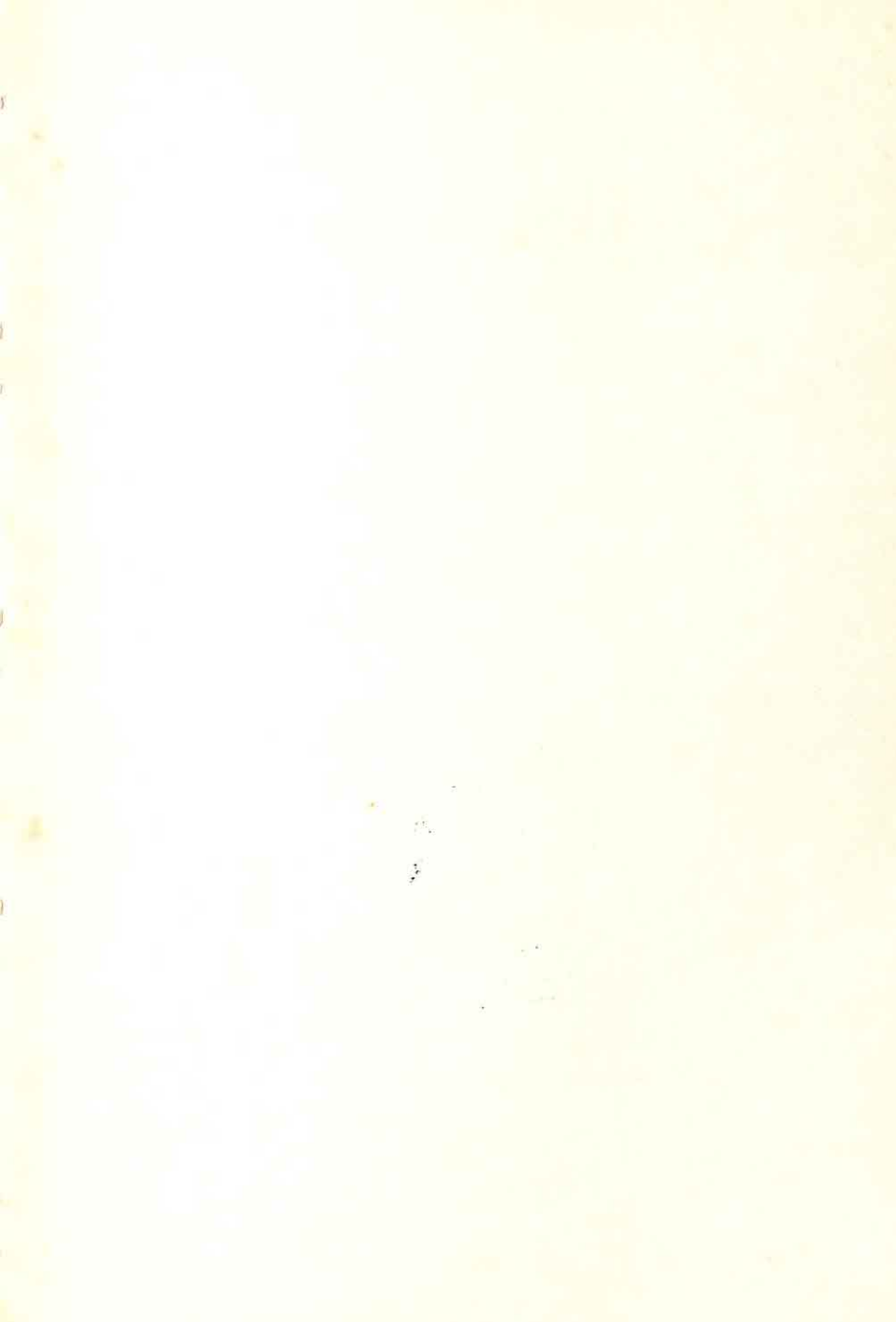
VALIDITY A term used to designate the extent to which a test measures what it is supposed to measure. For example, is the reading test measuring Bill's reading ability or his knowledge of science?

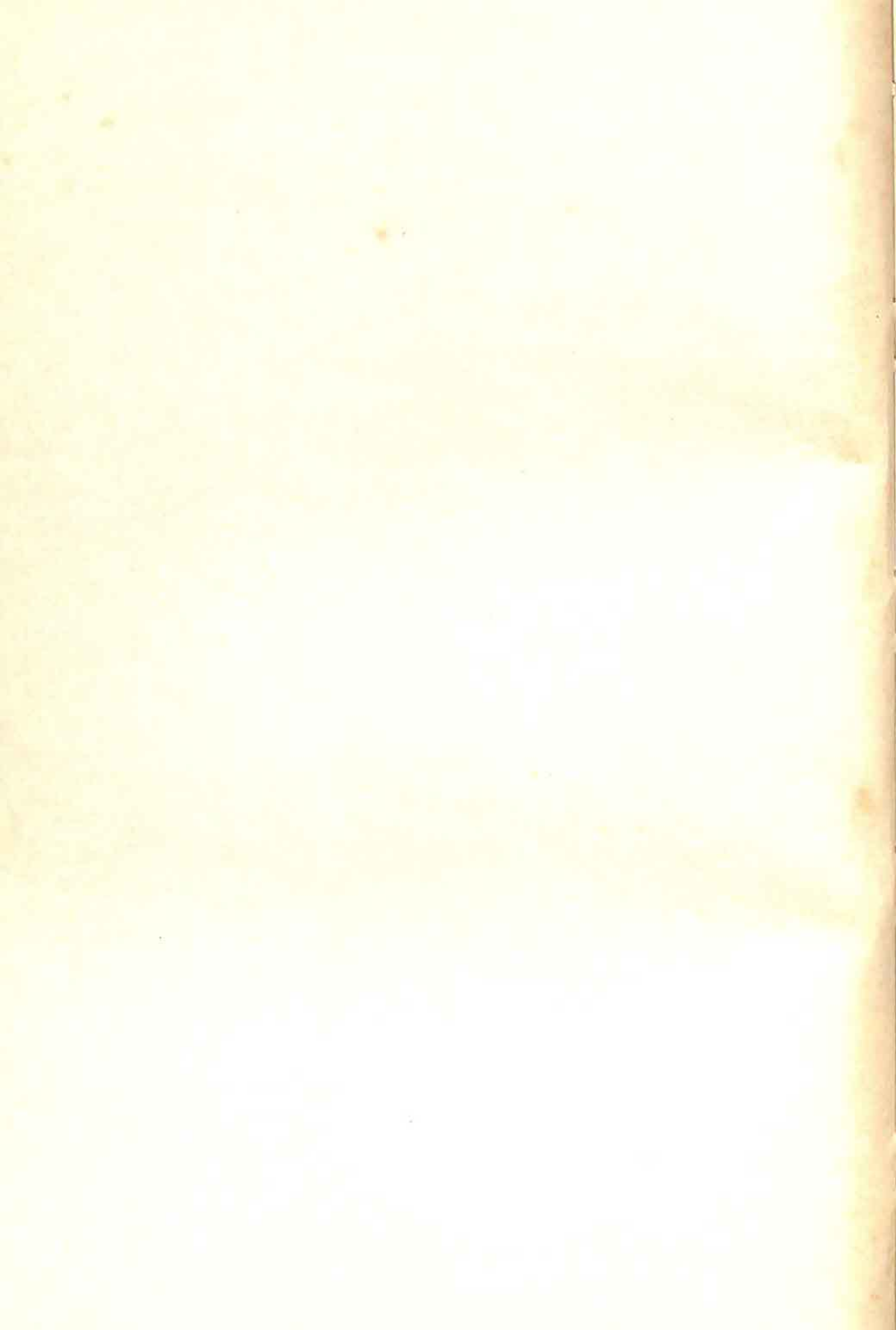
BIBLIOGRAPHY

- Anastasi, Anne. *Psychological Testing*, Second Edition. New York: Macmillan Company, 1961.
- Buros, Oscar K. *The Fifth Mental Measurements Yearbook*. Highland Park, N.J.: The Gryphon Press, 1959.
- College Entrance Examination Board. *A Description of the College Board Scholastic Aptitude Test*. Princeton, N.J.: College Entrance Examination Board, 1960.
- Cronbach, Lee J. *Essentials of Psychological Testing*, Second Edition. New York: Harper & Row, 1960.
- Engelhart, Max D. *Equivalents of Intelligence Quotients of Five Group Intelligence Tests*. Bureau of Pupil Personnel Services, Chicago Public Schools (Mimeographed report—no date).
- Fowler, Fred M. "Interest Measurement Questions and Answers," *School Life* (December 1945).
- Froehlich, Clifford P., and Kenneth B. Hoyt. *Guidance Testing*. Chicago: Science Research Associates, Inc., 1959.
- Garrett, Henry E. "The SPSSI and Racial Differences." *American Psychologist*, 17 (1962).
- Gerberich, Raymond J., et al. *Measurement and Evaluation in the Modern School*. New York: David McKay Company, Inc., 1962.
- Hebb, D. O. *A Textbook of Psychology*. Philadelphia: W. B. Saunders Company, 1958.
- Psychological Corporation. "On Telling Parents About Test Results," *Test Service Bulletin*, No. 51 (December 1959).
- . "How Accurate Is a Test Score?" *Test Service Bulletin*, No. 50 (June 1956).
- Rosenzweig, Saul. *Psychodiagnosis: An Introduction to the Integration of Tests in Dynamic Clinical Practice*. New York: Grune & Stratton, Inc., 1949.
- Terman, Lewis M., and Maud A. Merrill. *Measuring Intelligence*. Boston: Houghton Mifflin Company, 1937.
- . *Stanford-Binet Intelligence Scale: Manual for the Third Revision, Form L-M*. Boston: Houghton Mifflin Company, 1960.
- Thorndike, Robert J., and Elizabeth Hagen. *Measurement and Evaluation in Psychology and Education*, Second Edition. New York: John Wiley & Sons, Inc., 1961.

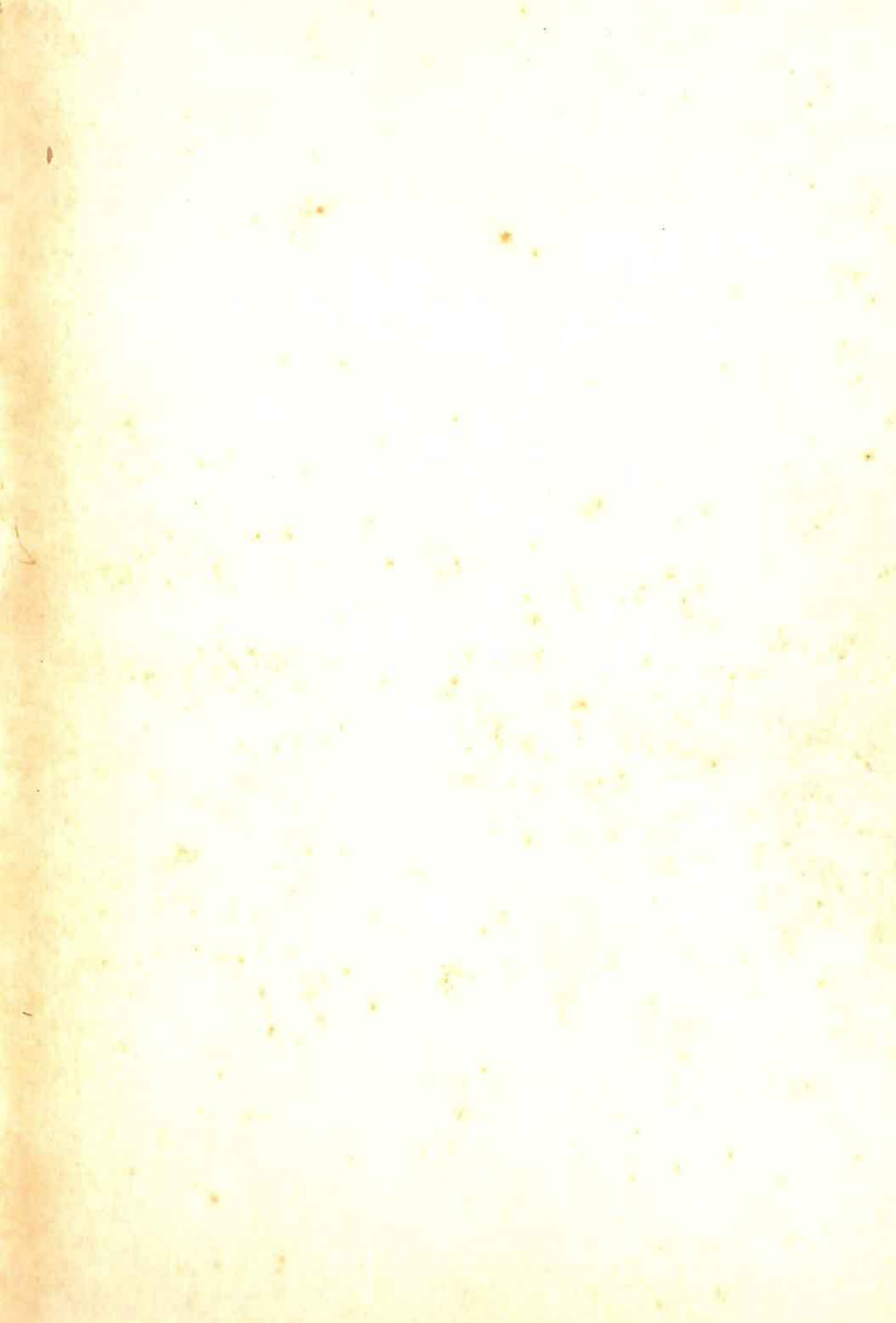
- Warren, Howard C. *Dictionary of Psychology*. Boston: Houghton Mifflin Company, 1934.
- Wechsler, David. *The Measurement and Appraisal of Adult Intelligence*. Baltimore: Williams & Wilkins Company, 1958.
- Welsh, George S., and W. Grant Dahlstrom. *Basic Readings on the MMPI in Psychology and Medicine*. Minneapolis: University of Minnesota Press, 1960.











Macmillan Guidebooks for Parents answer these questions:

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